NO.	X007-793
ISSUED:	FEB. 12, 2010
REVISED:	————

HOSHIZAKI
WATER ELECTROLYZER

MODEL ROX-30SA-E
ROX-60SA-E

SERVICE MANUAL

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In the context of this manual, the term "sanitizing water" refers to acidic water and "cleaning water" refers to alkaline water.

I. GENERAL INFORMATION

1. SAFETY INSTRUCTIONS

The following instructions contain important safety precautions and should be strictly observed. The terms used here are defined as follows:

WARNING: There is a possibility of death or serious injury to the service person and a third party or the user due to improper service operations or defects in serviced products.

CAUTION: There is a possibility of injury to the service person and a third party or the user or damage to their property* due to improper service operations or defects in serviced products.

* The term “damage to their property” here refers to extensive damage to household effects, houses and pets.

WARNING

1. When there is no need to energize the unit during disassembly or cleaning, be sure to unplug the unit or disconnect the main power supply before servicing the unit to prevent electric shocks.

2. If the unit must be energized for inspection of the electric circuit, use rubber gloves to avoid contact with any live parts, which may result in electric shocks.

3. Check for proper earth connections, and repair if necessary to prevent electric shocks.

4. Always use service parts intended for the applicable model for replacement of defective parts. Use proper tools to secure the wiring. Otherwise abnormal operation or trouble may occur and cause electric leaks or fire.

5. Check for proper part installations, wiring conditions and soldered or solderless terminal connections to avoid smoke, fire or electric shocks.

6. Be sure to replace damaged or deteriorated power cords and lead wires to prevent electric shocks, flames or smoke.

7. Lead wires using solderless terminals or the like must be bound with their closed ends up to avoid entrance of moisture that could lead to electric leaks or fire.

8. After servicing, always use a megohmmeter (500VDC) to check for the insulation resistance of minimum 1 megohm between the live part (attachment plug) and the dead

metal part (earth terminal). Negligence in checking may cause electric leaks or shocks.

9. Do not service the electrical parts with wet hands to prevent electric leaks or shocks.

10. Always ask the user to keep children away from the work area. They may be injured by tools or disassembled products.

CAUTION

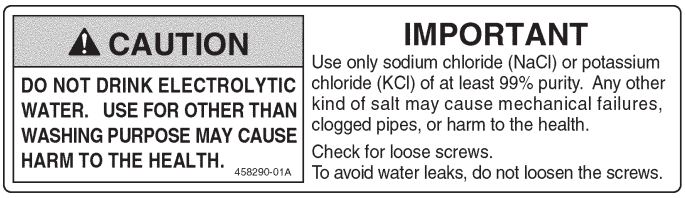
1. After servicing, be sure to check for water leaks from the water supply and drain lines to prevent wetting the surrounding properties.

2. After servicing, always check for proper operation.

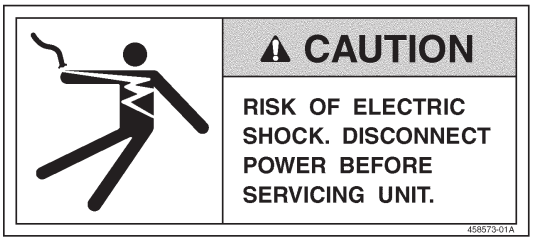
CAUTION LABEL LOCATION

The following caution labels are attached where special care should be taken.

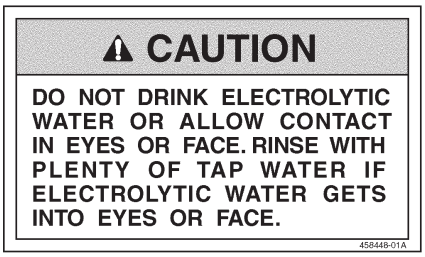
On top panel


⚠ CAUTION
DO NOT DRINK ELECTROLYTIC WATER. USE FOR OTHER THAN WASHING PURPOSE MAY CAUSE HARM TO THE HEALTH.
458290-01A
IMPORTANT
Use only sodium chloride (NaCl) or potassium chloride (KCl) of at least 99% purity. Any other kind of salt may cause mechanical failures, clogged pipes, or harm to the health.
Check for loose screws.
To avoid water leaks, do not loosen the screws.

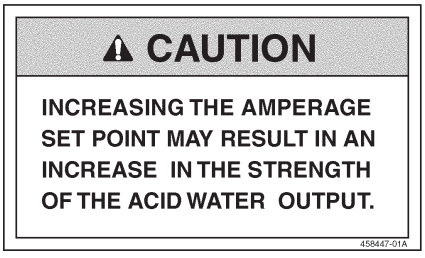
Inside door



On remote controller (option)


⚠ CAUTION
DO NOT DRINK ELECTROLYTIC WATER OR ALLOW CONTACT IN EYES OR FACE. RINSE WITH PLENTY OF TAP WATER IF ELECTROLYTIC WATER GETS INTO EYES OR FACE.
458448-01A

On bottom front of control box



2. PRODUCT INFORMATION

[a] FEATURES

1) Built-in neutralizer

The neutralizer is provided inside the unit to facilitate installation.

2) Flow rate

ROX-30SA-E: 1.5 - 3.0L/min
ROX-60SA-E: 3.0 - 6.0L/min

3) Standardized high pump head specification

The standardized 0.1MPa pressure switch allows for long pipe installation. Do not change the following settings.

Pressure switch: 0.1MPa
Flow rate switch: 1.5 - 2.0L/min

4) No air chamber drain required

The relief valve is provided to eliminate periodical air chamber drain and drain valve installation (water check valve is still required outside the unit).

5) Improved salt water tank door

The salt water tank door has been redesigned to prevent salt from spilling inside the unit.

6) Salt water tank overflow hose

In case the salt water tank overflow pipe clogs, the overflow hose prevents salt water from flowing out of the entire salt water tank by leaking salt water from a single spot (bottom panel mesh near neutralizer).

7) No valve required for downstairs water delivery

No electric ball valve installation is required to deliver electrolyzed water downstairs.

8) 25A vents

To meet the demand for increased ventilation capacity, another vent has been added for the netralizer and the vent size has been changed from 20A to 25A.

9) Production starts only by turning on power switch

Just turn on the power switch (earth leakage circuit breaker) to start producing electrolyzed water. There is no need to press the ON/OFF switch. In case of instantaneous power failure, the unit automatically resumes production.

10) Independent controls by systemized components

Idependent controls are provided for operations of cell A, cell B (ROX-60SA-E only), left and right water pumps, and salt water level. Even if one unit stops with error, the other keeps running and electrolyzed water is still available.

11) Common main control board

Both ROX-30SA-E and ROX-60SA-E use the same main control board with model identification by provision of CN37 connector (ROX-30SA-E: provided, ROX-60SA-E: not provided). Replacement of the main control board for ROX-30SA-E will require reconnection of the CN37 connector to the new board.

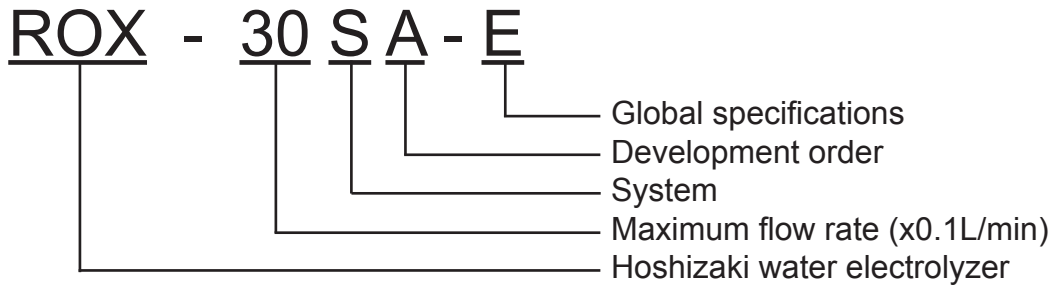
12) New VDW automatic dispensing valve

The automatic sensor dispensing valve has been renewed to improve design and user-friendliness. The LED lamps visually identify sanitizing water (red) and cleaning water (blue).

13) Exclusive remote controller

The new LED remote controller ROX-RCUA-E allows tank water level check from a remote site.

[b] MODEL NAME

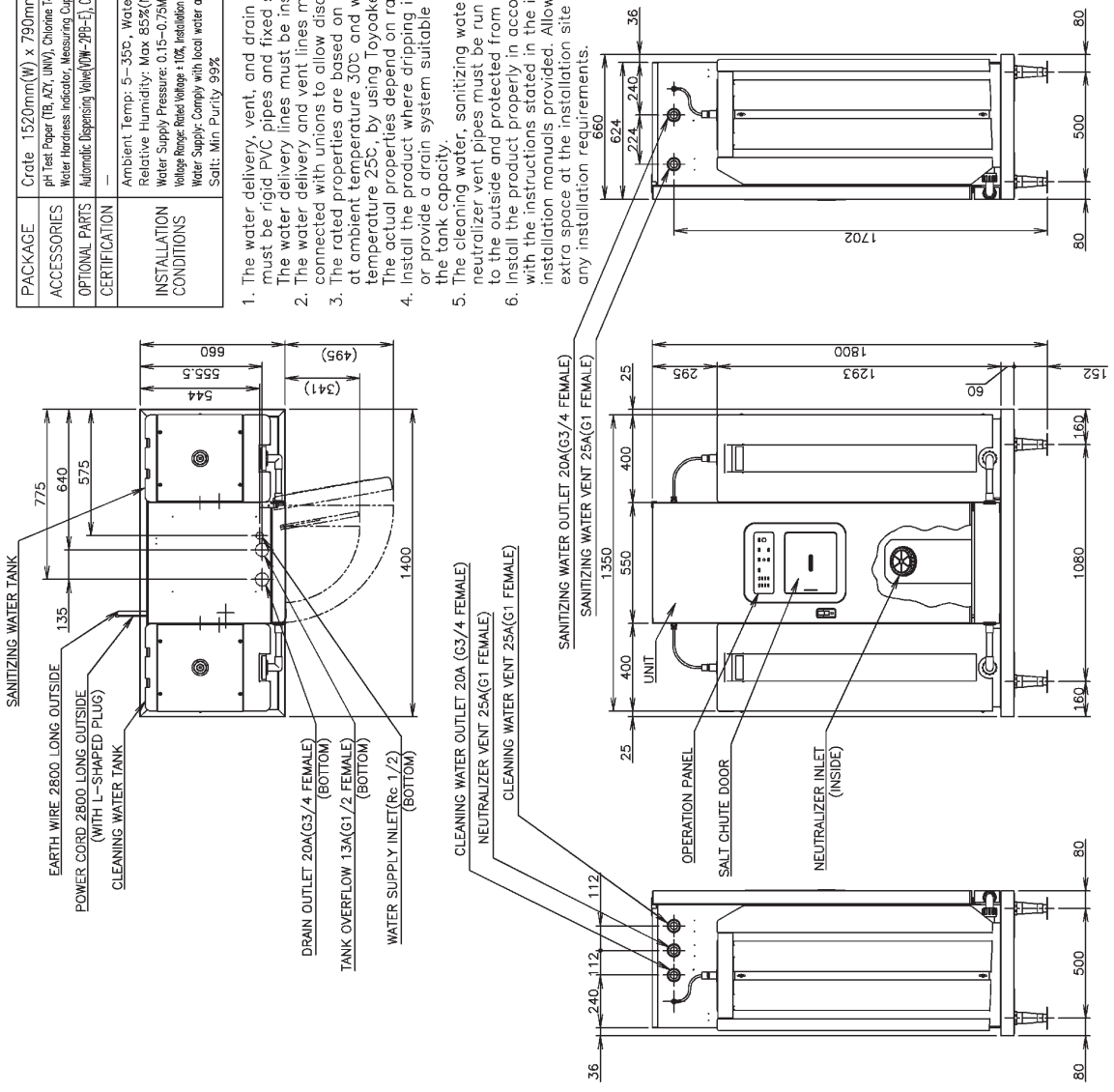


3. DIMENSIONS/SPECIFICATIONS

[a] ROX-30SA-E

PACKAGE	Crate 1520mm(W) x 790mm(D) x 1960mm(H)	ITEM	Hoshizaki Water Electrolyzer
ACCESSORIES	pH Test Paper (TB, AZV, UNV), Chlorine Test Paper, Operation Sheet, Water Hardness Indicator, Measuring Cup, Key, Neutralizing Agent	MODEL	ROX-30SA-E (EW)
OPTIONAL PARTS	Automatic Dispensing Valve(VDW-2PB-F), Operation Box, Valve Assembly	POWER SUPPLY	1 Phase 220-240V 50-60Hz 1.11kVA(5.1A)
CERTIFICATION	—	AMPERAGE	1.2/1.2A Pump operation: 2.9/3.8A
INSTALLATION CONDITIONS	Ambient Temp: 5-35C, Water Temp: 5-30C, Relative Humidity: Max 85%(No condensation), Water Supply Pressure: 0.15-0.75MPa(1.5-7.5bar)(gauge), Voltage Range: Rated Voltage ±10%, Installation Site: Indoor, Ventilation required Water Supply: Comply with local water and sewerage requirements, Salt: Min Purity 99%	ELECTRIC CONSUMPTION	190W/190W Pump operation: 620/820W
		STANDARD PERFORMANCE	FLOW RATE: Sanitizing/Cleaning Water: Approx. 2.0L/min
			AVAILABLE CHLORINE: Sanitizing Water: 20mg/kg(ppm) or more
			pH: Sanitizing Water: Approx. 3, Cleaning Water: Approx. 11 (Note) Water Temp 25C, Electrolytic Voltage 12V, Electrolytic Current 10A(Toyooke City Water)
		REFERENCE PERFORMANCE	FLOW RATE: Sanitizing/Cleaning Water: Approx. 1.5-3.0L/min (Min water supply pressure 0.25MPa (2.5bar) required for 2.0-3.0L/min)
			AVAILABLE CHLORINE: Sanitizing Water: 10mg/kg(ppm) or more(Flow Rate: 3L/min)
			pH: Sanitizing Water: Approx.2.9-3.3, Cleaning Water: Approx.10.5-11.0 (Note) Depends on raw water quality and temperature.
		SETUP	TANK CAPACITY: Sanitizing/Cleaning Water: Approx. 200L(Available Capacity 180L)
			DISCHARGE RATE: Sanitizing/Cleaning Water: Approx. 25/28L/min(at outlet)
			DISCHARGE HEAD: 5m
			SALT WATER TANK: Max 12kg
			WATER SOFTENER: Ion Exchange Resin Volume: 6L Max Water Flow: 360L/h
			NEUTRALIZER: Neutralize sanitizing water overflow with neutralizing agent (Max Capacity 12kg)
		OUTSIDE DIMENSIONS	1400mm(W) x 660mm(D) x 1800(-1830)mm(H)
		EXTERIOR	PANEL: ABS Plastic
			CABINET: Painted Steel Sheet(Polyester Powder Painted)
			TANK: Polyethylene Plastic
		ELECTROLYSIS SYSTEM	Membrane Technology
		DILUTE SALT WATER ADJUSTMENT SYSTEM	Direct Electromagnetic Pump Injection Method
		ELECTROLYTIC CURRENT ADJUSTMENT SYSTEM	Automatic Adjustment(with Water Temp Correction)
		ELECTROLYTIC VOLTAGE ADJUSTMENT SYSTEM	Automatic Adjustment
		FLOW RATE ADJUSTMENT SYSTEM	Automatic Adjustment by Switch Operation (Low/Medium/High)
		WATER SUPPLY SYSTEM	Direct Connection to Water Main (Pressure reducing valve provided) Rc 1/2
		START / STOP	Push Button
		DISPLAY	Operation, Add Salt, Add Neutralizer, Tank Level, Flush(Reverse Dispensing), Error, Replace Cell
		CONNECTIONS	Water Inlet Rc1/2, Water Outlet 20A (G3/4 Female, Sanitizing/Cleaning Water) Drain Outlet 20A (G3/4 Female) x 1, 13A (G1/2 Female) x 1
		VENT	25A(G1 Female Thread) x 3
		CELL POLARITY SWITCHING CONTROL	Timer-Programmable Controller (Protection for power failure)
		CELL POWER SUPPLY	Constant Voltage DC Power Supply(150W)
		CELL REPLACEMENT TIME	Timer-Programmable Controller (Protection for power failure)
		SALT WATER USAGE CONTROL	Float Switch
		DILUTE SALT WATER CONCENTRATION	Automatic Adjustment by Electrolytic Current and Electrolytic Voltage
		ELECTRIC CIRCUIT PROTECTION	Earth Leakage Circuit Breaker(with Overcurrent Protector), Earth Wire, Fuse(for PC Board: 5A)
		SAFETY DEVICE PROTECTION	Emergency Stop by Microprocessor Control
		Leg	Plastic Adjustable 150-180 mm
		WEIGHT	230kg (Gross 280kg)

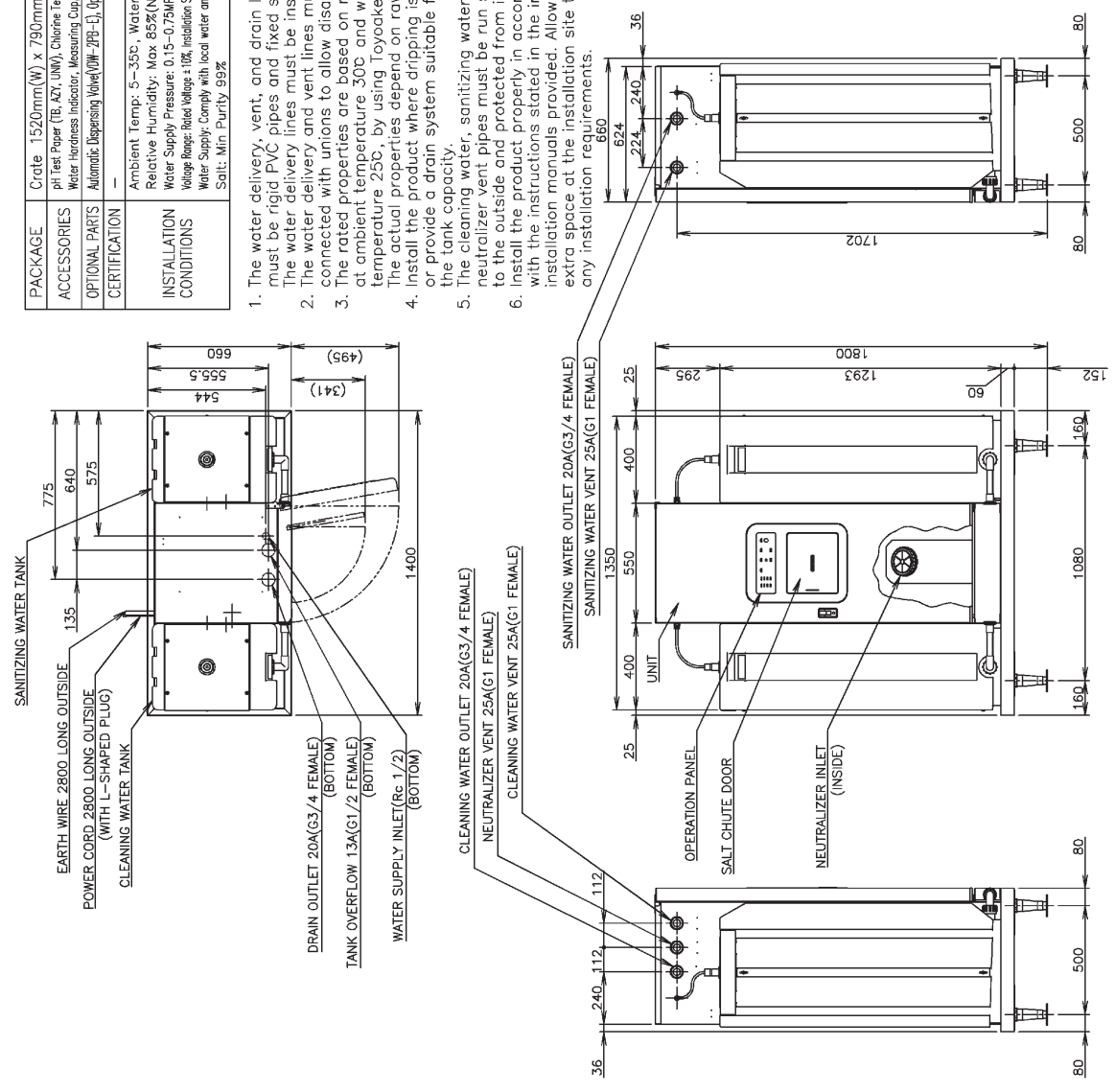
1. The water delivery, vent, and drain lines must be rigid PVC pipes and fixed securely. The water delivery lines must be insulated.
2. The water delivery and vent lines must be connected with unions to allow disassembly.
3. The rated properties are based on measurements at ambient temperature 30C and water temperature 25C, by using Toyooke City water. The actual properties depend on raw water quality.
4. Install the product where dripping is allowed, or provide a drain system suitable for the tank capacity.
5. The cleaning water, sanitizing water, and neutralizer vent pipes must be run separately to the outside and protected from insects.
6. Install the product properly in accordance with the instructions stated in the instruction and installation manuals provided. Allow 10mm extra space at the installation site to meet any installation requirements.



[b] ROX-60SA-E

PACKAGE	Crate 1520mm(W) x 790mm(D) x 1960mm(H)	ITEM				Hoshizaki Water Electrolyzer
ACCESSORIES	pH Test Paper (TB, AZV, UNV), Chlorine Test Paper, Operation Sheet, Water Hardness Indicator, Measuring Cup, Key, Neutralizing Agent	MODEL				ROX-60SA-E (EW)
OPTIONAL PARTS	Automatic Dispensing Valve(VDW-2PB-E), Operation Box, Valve Assembly	POWER SUPPLY				1 Phase 220-240V 50-60Hz 1.11kVA(5.1A)
CERTIFICATION	–	AMPERAGE				2.1/2.1A Pump operation: 2.9/3.8A
INSTALLATION CONDITIONS	Ambient Temp: 5-35℃, Water Temp: 5-30℃, Relative Humidity: Max 85%(No condensation), Water Supply Pressure: 0.15-0.75MPa(1.5-7.5bar)(gauge), Voltage Range: Rated Voltage ±10%, Installation Site: Indoor, Ventilation required Water Supply: Comply with local water and sewerage requirements, Salt: Min Purity 99%	ELECTRIC CONSUMPTION				350W/350W Pump operation: 620/820W
		SETUP	STANDARD PERFORMANCE	FLOW RATE		Sanitizing/Cleaning Water: Approx. 4.0L/min
				AVAILABLE CHLORINE	pH	Sanitizing Water: 20mg/kg(ppm) or more Sanitizing Water: Approx. 3, Cleaning Water: Approx. 11 [Note] Water Temp 25℃, Electrolytic Voltage 12V, Electrolytic Current 10A(Toyooke City Water)
			REFERENCE PERFORMANCE	FLOW RATE		Sanitizing/Cleaning Water: Approx. 3.0-6.0L/min [Min water supply pressure 0.25MPa(2.5bar) required for 4.0-6.0L/min]
				AVAILABLE CHLORINE	pH	Sanitizing Water: 10mg/kg(ppm) or more(Flow Rate: 6L/min) Sanitizing Water: Approx.2.9-3.3, Cleaning Water: Approx.10.5-11.0 [Note] Depends on raw water quality and temperature
				TANK CAPACITY		Sanitizing/Cleaning Water: Approx. 200L(Available Capacity 180L)
				DISCHARGE RATE		Sanitizing/Cleaning Water: Approx. 25/28L/min(at outlet)
				DISCHARGE HEAD		5m
			SALT WATER TANK			Max 12kg
			WATER SOFTENER			Ion Exchange Resin Volume: 12L Max Water Flow: 750L/h
			NEUTRALIZER			Neutralize sanitizing water overflow with neutralizing agent (Max Capacity 12kg)
		OUTSIDE DIMENSIONS				1400mm(W) x 660mm(D) x 1800(-1830)mm(H)
		EXTERIOR	PANEL			ABS Plastic
			CABINET			Painted Steel Sheet(Polyester Powder Painted)
			TANK			Polyethylene Plastic
		ELECTROLYSIS SYSTEM				Membrane Technology
		DILUTE SALT WATER ADJUSTMENT SYSTEM				Direct Electromagnetic Pump Injection Method
		ELECTROLYTIC CURRENT ADJUSTMENT SYSTEM				Automatic Adjustment(with Water Temp Correction)
		ELECTROLYTIC VOLTAGE ADJUSTMENT SYSTEM				Automatic Adjustment
		FLOW RATE ADJUSTMENT SYSTEM				Automatic Adjustment by Switch Operation (Low/Medium/High)
		WATER SUPPLY SYSTEM				Direct Connection to Water Main (Pressure reducing valve provided) Rc 1/2
		START / STOP				Push Button
		DISPLAY				Operation, Add Salt, Add Neutralizer, Tank Level, Flush(Reverse Dispensing), Error, Replace Cell
		CONNECTIONS				Water Inlet Rc1/2, Water Outlet 20A (G3/4 Female, Sanitizing/Cleaning Water) Drain Outlet 20A (G3/4 Female) x 1, 13A (G1/2 Female) x 1
		VENT				25A(G1 Female Thread) x 3
		CELL POLARITY SWITCHING CONTROL				Timer-Programmable Controller (Protection for power failure)
		CELL POWER SUPPLY				Constant Voltage DC Power Supply(150W x 2)
		CELL REPLACEMENT TIME				Timer-Programmable Controller (Protection for power failure)
		SALT WATER USAGE CONTROL				Float Switch
		DILUTE SALT WATER CONCENTRATION				Automatic Adjustment by Electrolytic Current and Electrolytic Voltage
		ELECTRIC CIRCUIT PROTECTION				Earth Leakage Circuit Breaker(with Overcurrent Protector), Earth Wire, Fuse(for PC Board: 5A)
		SAFETY DEVICE PROTECTION				Emergency Stop by Microprocessor Control
		Leg				Plastic Adjustable 150-180 mm
		WEIGHT				250kg (Gross 300kg)

1. The water delivery, vent, and drain lines must be rigid PVC pipes and fixed securely. The water delivery lines must be insulated.
2. The water delivery and vent lines must be connected with unions to allow disassembly.
3. The rated properties are based on measurements at ambient temperature 30℃ and water temperature 25℃, by using Toyooke City water. The actual properties depend on raw water quality.
4. Install the product where dripping is allowed, or provide a drain system suitable for the tank capacity.
5. The cleaning water, sanitizing water, and neutralizer vent pipes must be run separately to the outside and protected from insects.
6. Install the product properly in accordance with the instructions stated in the instruction and installation manuals provided. Allow 10mm extra space at the installation site to meet any installation requirements.



II. TECHNICAL INFORMATION

1. PRINCIPLE OF ELECTROLYSIS

Water (H_2O) we use in our daily life has a mysterious power. Adding a small amount of salt (NaCl) to water (H_2O) and electrolyzing it with special electrodes will generate "electrolytic oxidizing water (acidic water)" with strong oxidizing effects and "electrolytic reducing water (alkaline water)" with strong reducing effects. Here we explain this electrolysis process and the meaning of such terms as "pH" and "oxidization/reduction" which may sound unfamiliar.

Electrolysis Process - See the diagram on the following page for the electrolysis mechanism inside the electrolytic cell.

1) Electrolysis with a higher salt concentration around 5 - 20% is apt to generate chlorine gas (Cl_2) at the anode. The electrolyzer with a lower salt concentration around 0.07 - 0.15% is apt to generate hypochlorous acid (HOCl) at the anode.
2) At the anode, oxidization will generate hypochlorous acid (HOCl) and chlorine gas (Cl_2).
3) At the cathode, reduction will generate hydrogen gas (H_2) and sodium hydroxide (NaOH).

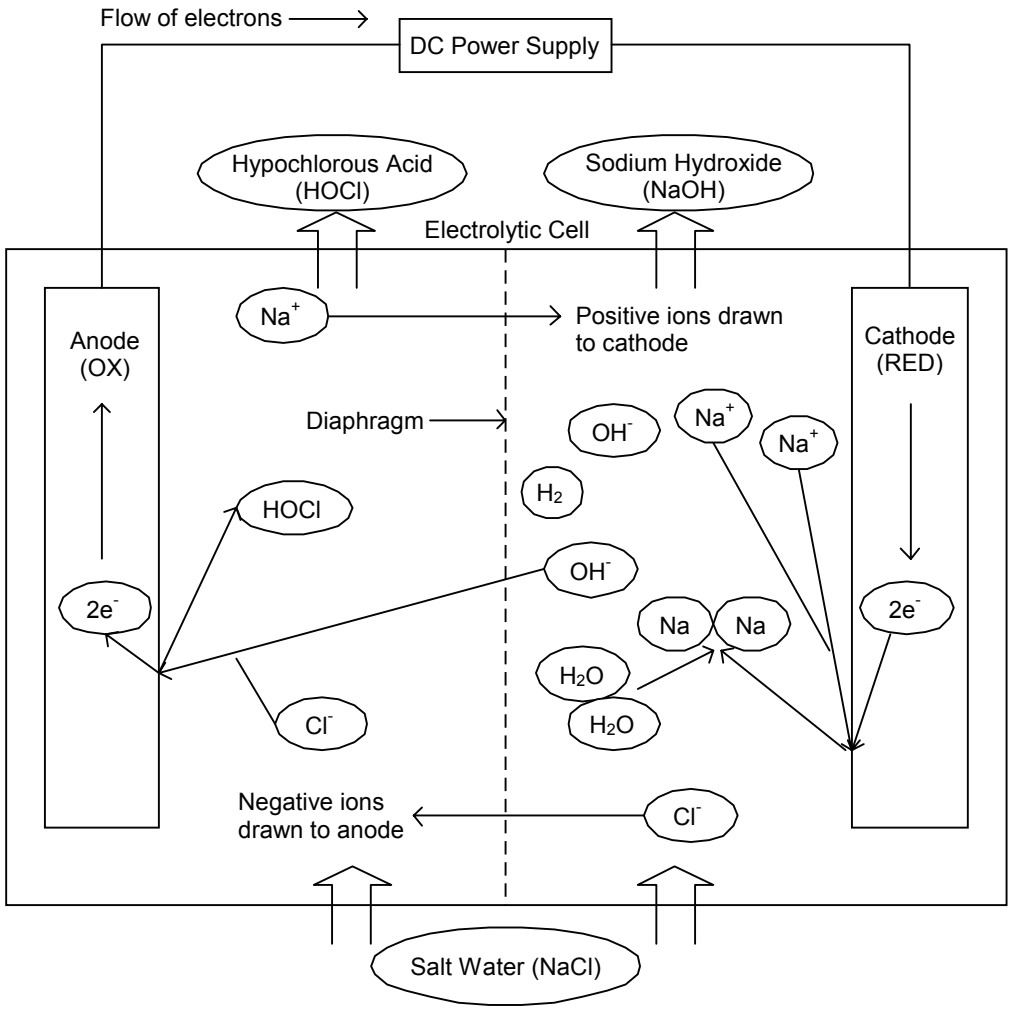
Oxidization/Reduction - Oxidization and reduction occur a the same time, while electrons are transferred.

1) Oxidization - Reaction of a substance to emit electrons.
2) Reduction - Reaction of a substance to receive electrons.

Oxidization/Reduction Potential - Degree of liability to oxidization and reduction, indicated in "mV".

1) Positive potential - An oxidizing agent (= a substance capable of oxidizing other substances) is contained. The higher potential shows the higher tendency to oxidize other substances.
2) Negative potential - An reducing agent (= a substance capable of reducing other substances) is contained. The lower potential shows the higher tendency to reduce other substances.

pH - Concentration index of hydrogen ions. pH7 means neutrality, the higher pH alkalinity, and the lower pH acidity.



Reactions at Anode

Chloride ions (Cl^-) and hydroxide ions emit electrons (e^-) to the anode, which become hypochlorous acid (HOCl).

Reactions at Cathode

Sodium ions (Na^+) receive electrons (e^-) from the cathode and become sodium metal (Na) which reacts with water (H_2O) and becomes sodium hydroxide (NaOH) and hydrogen gas (H_2).

Salt water contains four kinds of ions; sodium ions (Na^+), chlorine ions (Cl^-), hydrogen ions (H^+) and hydroxide ions (OH^-).

$NaCl + H_2O \rightarrow Na^+ + Cl^- + H^+ + OH^-$
(Mix water and salt) Salt water (4 kinds of ions)

When two electrodes are inserted into salt water and voltage is applied:

Negative ions (Cl^-) are drawn to the anode, and
Positive ions (Na^+) are drawn to the cathode.

At the anode, hydrogen chloride (HCl) and hypochlorous acid (HOCl) are generated.

$2Cl^- + H_2O \rightarrow HCl + HOCl + 2e^-$

Electrons ($2e^-$) are emitted to the anode, which means the acid water (HCl + HOCl) causes oxidization. [As electrons are emitted, the oxidization/reduction potential becomes positive (+mV).]
Chlorine ions also emit electrons and become chlorine gas (Cl_2).

$2Cl^- \rightarrow Cl_2 + 2e^-$
(Cl_2 = chlorine gas)

At the cathode, sodium hydroxide (NaOH) and hydrogen gas (H_2) are generated.

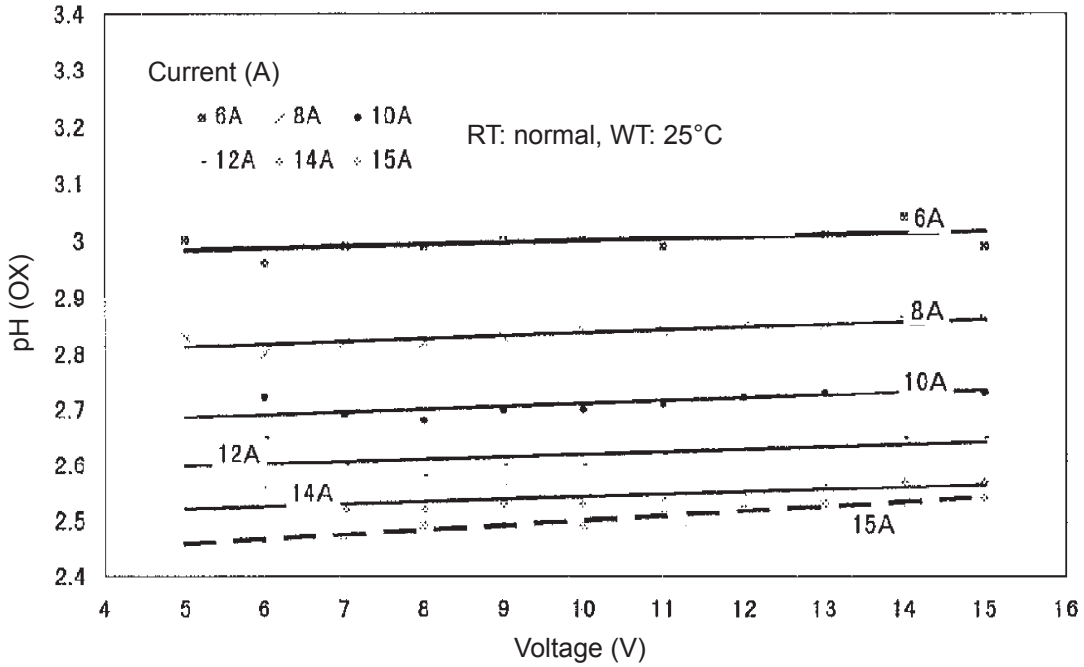
$Na^+ + H_2O + H^+ + 2e^- \rightarrow NaOH + H_2$

Electrons ($2e^-$) are received from the cathode, which means the alkali water (NaOH) causes reduction. [As electrons are received, the oxidization/reduction potential becomes negative (-mV).]

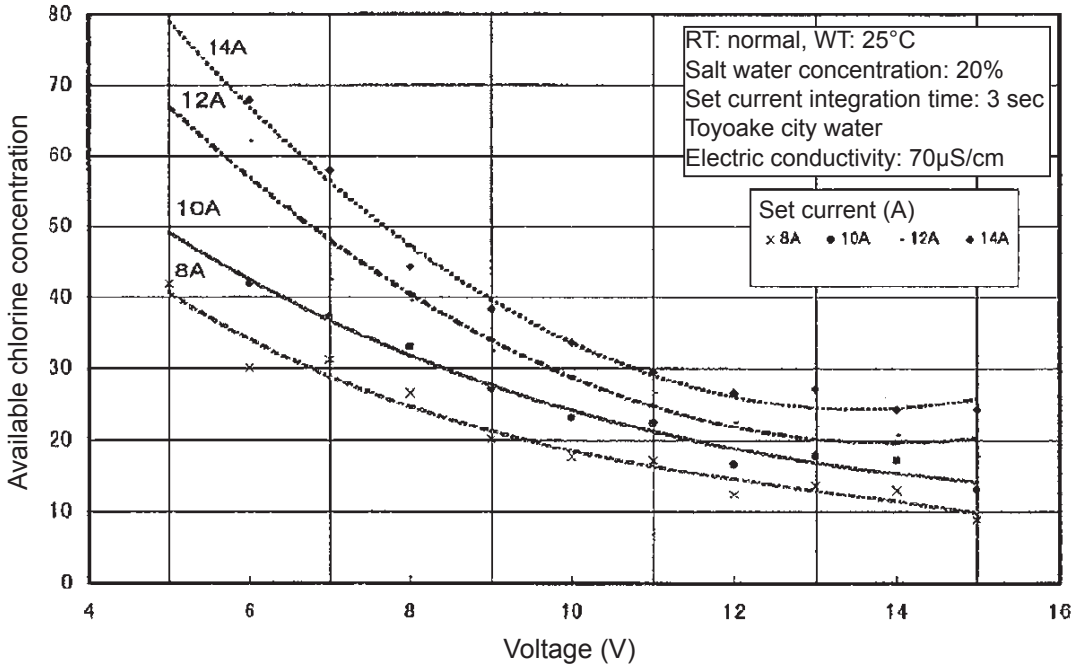
2. TEMPERATURE CORRECTION FUNCTION

Due to the properties of electrolyzed water, low water temperatures in winter may cause excessively high available chlorine concentrations. For purpose of protection, a thermistor is provided to detect water temperatures and automatically lower electrolytic current.

Current and pH



Current and sanitizing water available chlorine concentration



Water temperature and sanitizing water available chlorine concentration

Factor / Water temperature	Electric conductivity required for electrolysis	Salt water supply	Resulting sanitizing water available chlorine concentration
High (30°C)	Low (approx. 2,300μS/cm)	Low (approx. 2.7g/L)	Low (approx. 37mg/L)
Low (5°C)	High (approx. 4,250μS/cm)	High (approx. 5.6g/L)	High (approx. 65mg/L)

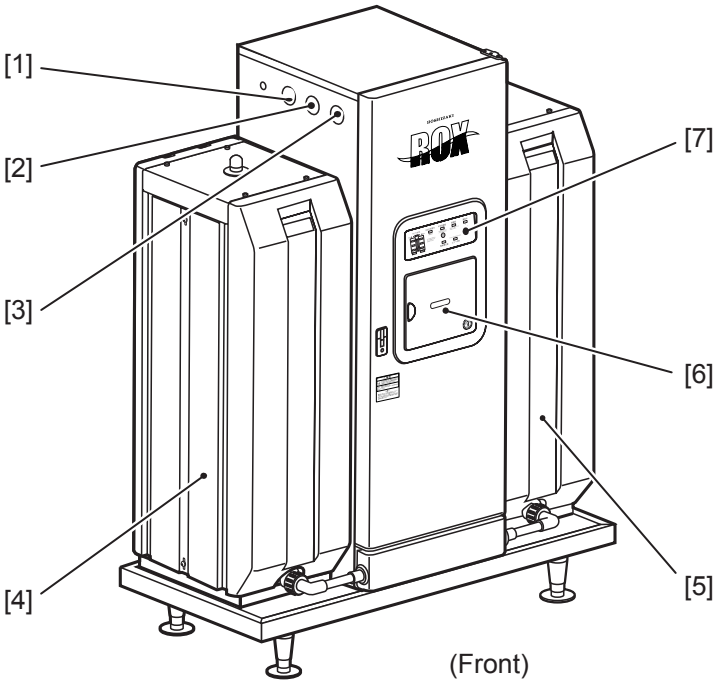
Thermistor (Taico NBFC-36-T2) temperature properties

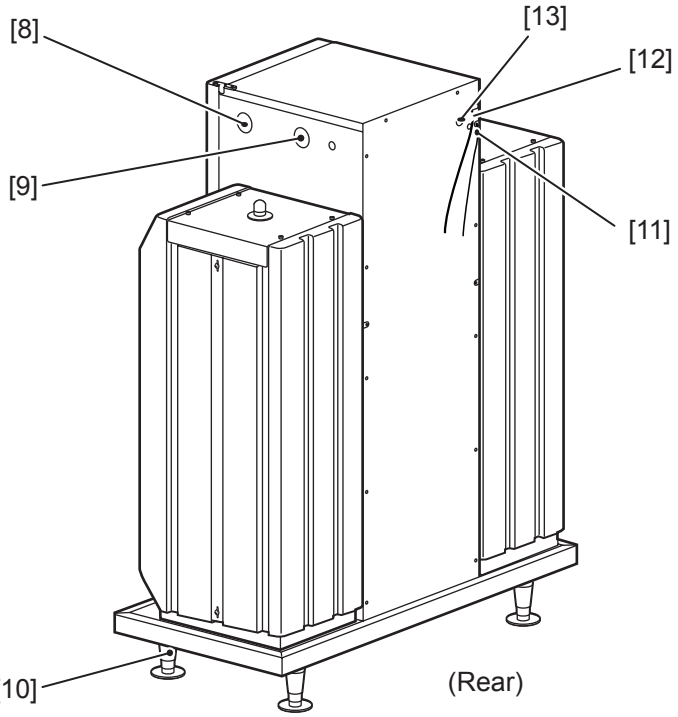
Temperature (°C)	Lower limit (kΩ)	Standard value (kΩ)	Upper limit (kΩ)
-10.0	9.025	9.392	9.765
-9.0	8.627	8.969	9.317
-8.0	8.249	8.568	8.891
-7.0	7.889	8.187	8.488
-6.0	7.548	7.825	8.105
-5.0	7.223	7.481	7.741
-4.0	6.914	7.154	7.396
-3.0	6.620	6.844	7.068
-2.0	6.340	6.548	6.757
-1.0	6.074	6.267	6.461
0.0	5.820	6.000	6.180
1.0	5.568	5.746	5.923
2.0	5.329	5.503	5.679
3.0	5.101	5.273	5.446
4.0	4.884	5.053	5.224
5.0	4.678	4.844	5.012
6.0	4.481	4.645	4.810
7.0	4.294	4.455	4.617
8.0	4.116	4.273	4.433
9.0	3.946	4.100	4.257
10.0	3.784	3.935	4.089
11.0	3.630	3.778	3.929
12.0	3.483	3.628	3.776
13.0	3.342	3.484	3.630
14.0	3.208	3.348	3.490
15.0	3.080	3.217	3.356
16.0	2.958	3.092	3.229
17.0	2.841	2.972	3.106
18.0	2.730	2.858	2.989
19.0	2.624	2.749	2.877
20.0	2.522	2.644	2.770

Temperature (°C)	Lower limit (kΩ)	Standard value (kΩ)	Upper limit (kΩ)
21.0	2.425	2.545	2.668
22.0	2.332	2.449	2.570
23.0	2.243	2.358	2.476
24.0	2.158	2.270	2.385
25.0	2.077	2.186	2.299
26.0	1.999	2.106	2.216
27.0	1.925	2.029	2.137
28.0	1.853	1.955	2.061
29.0	1.785	1.885	1.988
30.0	1.720	1.817	1.918
31.0	1.657	1.752	1.851
32.0	1.597	1.690	1.786
33.0	1.539	1.630	1.724
34.0	1.484	1.573	1.665
35.0	1.431	1.518	1.608
36.0	1.381	1.465	1.553
37.0	1.332	1.414	1.501
38.0	1.285	1.366	1.450
39.0	1.240	1.319	1.401
40.0	1.197	1.274	1.355
41.0	1.156	1.231	1.310
42.0	1.116	1.190	1.266
43.0	1.078	1.150	1.225
44.0	1.042	1.111	1.185
45.0	1.006	1.075	1.146
46.0	0.9727	1.039	1.109
47.0	0.9402	1.005	1.074
48.0	0.9089	0.9724	1.039
49.0	0.8789	0.9409	1.006
50.0	0.8500	0.9106	0.9746
51.0	0.8222	0.8814	0.9439
52.0	0.7954	0.8532	0.9144
53.0	0.7697	0.8261	0.8859
54.0	0.7449	0.8000	0.8585
55.0	0.7210	0.7749	0.8321
56.0	0.6981	0.7507	0.8066
57.0	0.6759	0.7273	0.7820
58.0	0.6546	0.7048	0.7583
59.0	0.6341	0.6832	0.7354
60.0	0.6143	0.6622	0.7133

3. CONSTRUCTION

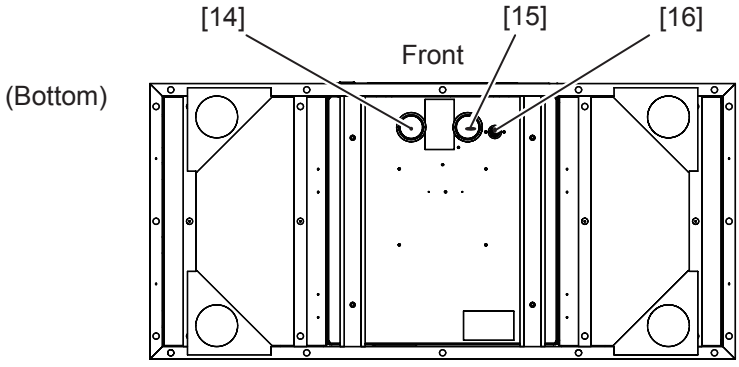
[a] EXTERIOR





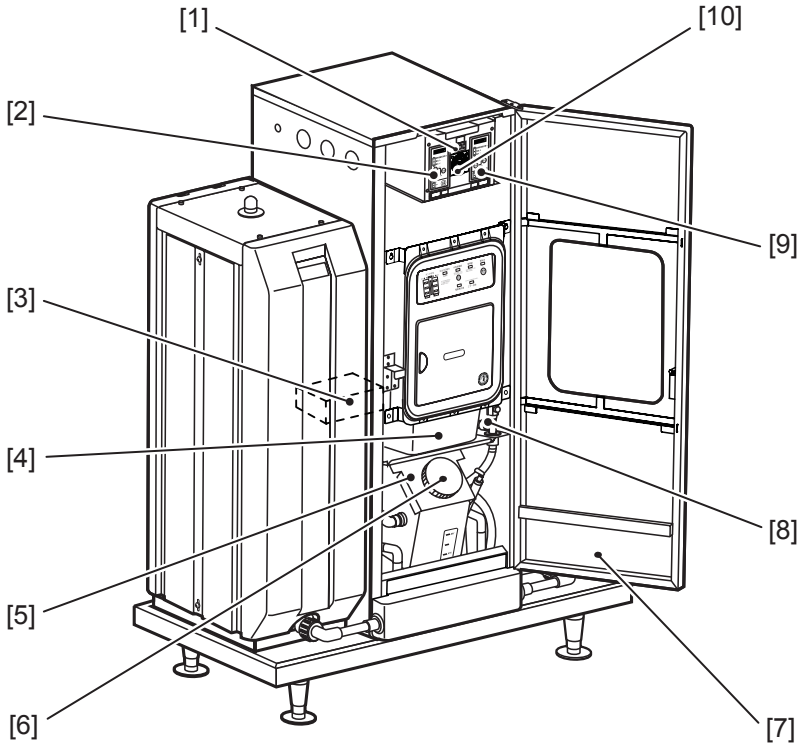
[1] Cleaning Water Outlet (20A)
[2] Neutralizer Vent (25A)
[3] Cleaning Water Vent (25A)
[4] Water Tank (Left)
Holds cleaning water in normal dispensing mode and sanitizing water in reverse dispense mode.
[5] Water Tank (Right)
Holds sanitizing water in normal dispensing mode and cleaning water in reverse dispense mode.
[6] Salt Chute Door
Open to add in salt.
[7] Operation Panel
Indicates the state of operation. See “[e] OPERATION PANEL”.

[8] Sanitizing Water Vent (25A)
[9] Sanitizing Water Outlet (20A)
[10] Adjustable Legs
Keep the unit level and stable.
[11] Earth Wire
Ensure proper earth connection to prevent electric shock.
[12] Power Cord (with L-shaped plug)
[13] Grommet
Receives the cable from the operation box (option).



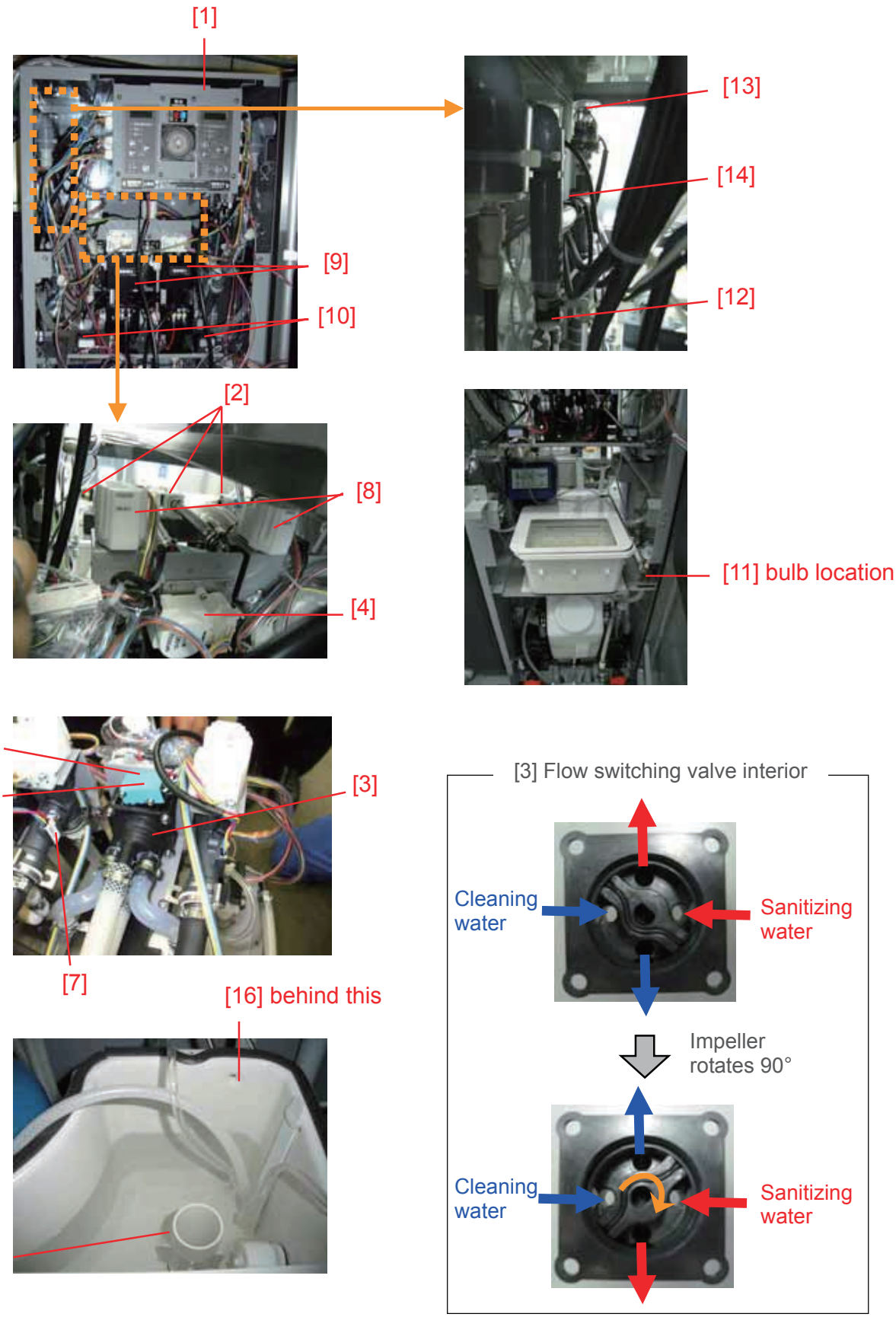
[14] Drain Outlet (G3/4 female)
[15] Tank Drain Outlet (G1/2 female)
[16] Water Inlet (Rc1/2 female)

[b] INTERIOR



[1] Power Switch (Earth Leakage Circuit Breaker)
Turns on and off the power supply.
[2] Control Panel (B)
ROX-60SA-E only. Provided with buttons and display for setting cell functions. See “[f] CONTROL PANEL (A) (B)”.
[3] Water Softener
Softens tap water.
[4] Salt Water Tank
Dilutes salt to make salt water.
[5] Neutralizer
Neutralizes sanitizing water pH.
[6] Neutralizer Inlet
Open to add in neutralizing agent.
[7] Water Softener Timer
Sets the present time and regeneration time. See “[g] WATER SOFTENER TIMER”.
[8] Control Panel (A)
Provided with buttons and display for setting cell functions. See “[f] CONTROL PANEL (A) (B)”.
[9] Water Sampling Tap
Sample water to check water hardness.
[10] Door
Open/close to evacuate the salt water pump and add in neutralizing agent.

[c] MECHANISM


[1]
[9]
[10]
[2]
[8]
[4]
[13]
[14]
[12]
[11] bulb location
[5]
[6]
[3]
[7]
[16] behind this
[15]
[3] Flow switching valve interior
Cleaning water
Sanitizing water
Impeller rotates 90°
Cleaning water
Sanitizing water

[1] Control Box

Functions as the brain of the electrolyzer to control its operation (see "[d] CONTROL BOX" for details).

[2] Water Valve

Supplies water from the water supply hose to the electrolytic cell or salt water tank.

[3] Flow Switching Valve

Operates every 12 hours to change the flow direction when the DC voltage to the electrolytic cell reverses.

[4] Gear Motor

Rotates the impeller inside the flow switching valve.

[5] Microswitch (Location)

Senses the location of the flow switching valve. On the motor side.

[6] Microswitch (Direction)

Senses the direction of the flow switching valve. On the hose side.

[7] Flow Rate Sensor (Production)

Measures the flow rate to the electrolytic cell.

[8] Flow Rate Valve

Located between the water supply inlet and the electrolytic cell. Adjusts the rate of water supply.

[9] Electrolytic Cell

Electrolyzes diluted salt water and produces sanitizing water and cleaning water. Provided on the right side only for ROX-30SA-E.

[10] Salt Water Pump

Feeds a fixed amount of concentrated salt water (electrolyte) into the electrolytic cell.

[11] Thermistor

Senses the water temperature to prevent excessive available chlorine concentration in low temperature conditions.

[12] Relief Valve

Operates when water delivery pipe pressure exceeds 0.3MPa and releases water into the water tank to prevent water hammer.

[13] Pressure Switch

Detects water delivery pipe pressure and switches on/off.

[14] Flow Rate Switch (Water Delivery)

Detects water delivery pipe flow rate and switches on/off.

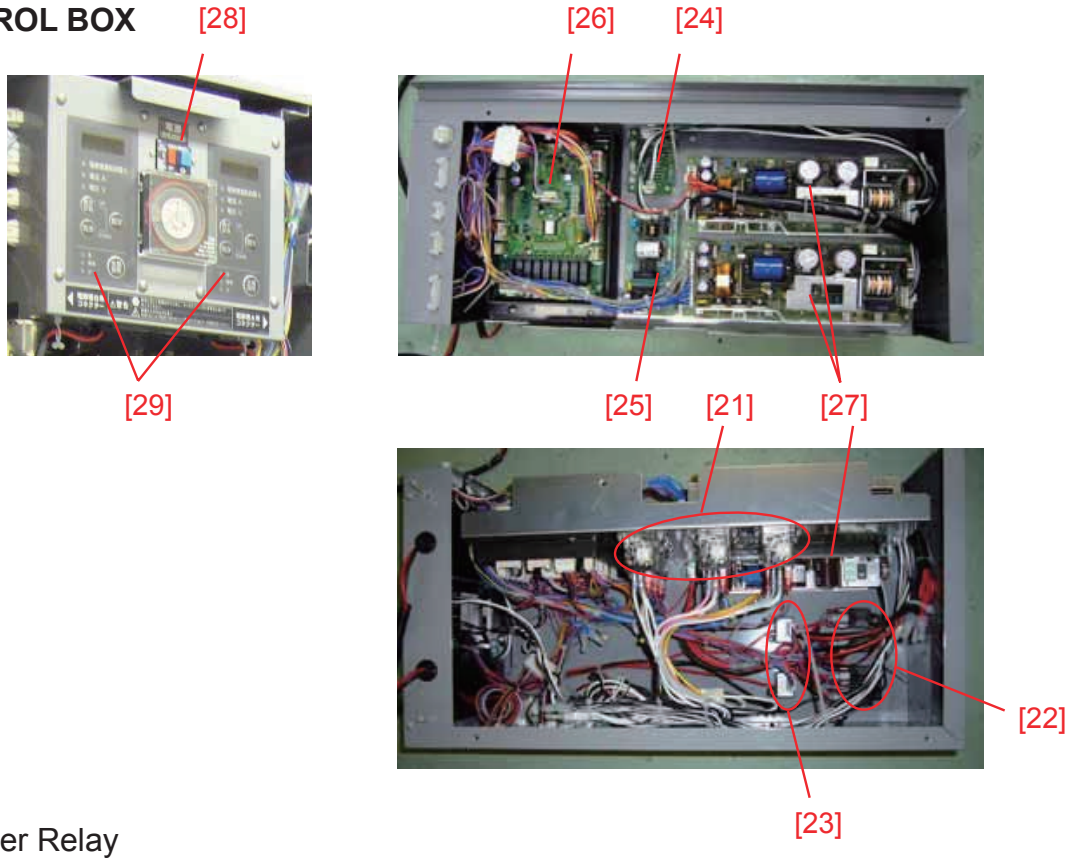
[15] Overflow Pipe

Keeps the salt water tank from leaking. Turn to the left to remove. Also functions as a drain pipe.

[16] Overflow Hose

Prevents salt water from flowing out of the entire salt water tank in case the overflow pipe clogs, by leaking salt water from a single spot (bottom panel mesh near neutralizer).

[d] CONTROL BOX



[21] Bipower Relay
Turns on/off the supply line of the DC power supply [electrolytic cell]. Coil voltage 12VDC, contact current 10A.

[22] CB Relay
Changes the polarity of the voltage on the electrolytic cell. Coil voltage 12VDC, contact current 30A.

[23] Current Sensor
Measures the current of the electrolytic cell.

[24] Noise Absorber
Noise absorbing board provided with a surge absorber.

[25] DC Power Supply (Main Control Board)
DC power supply to drive the DC electrical components. Output voltage 5V.

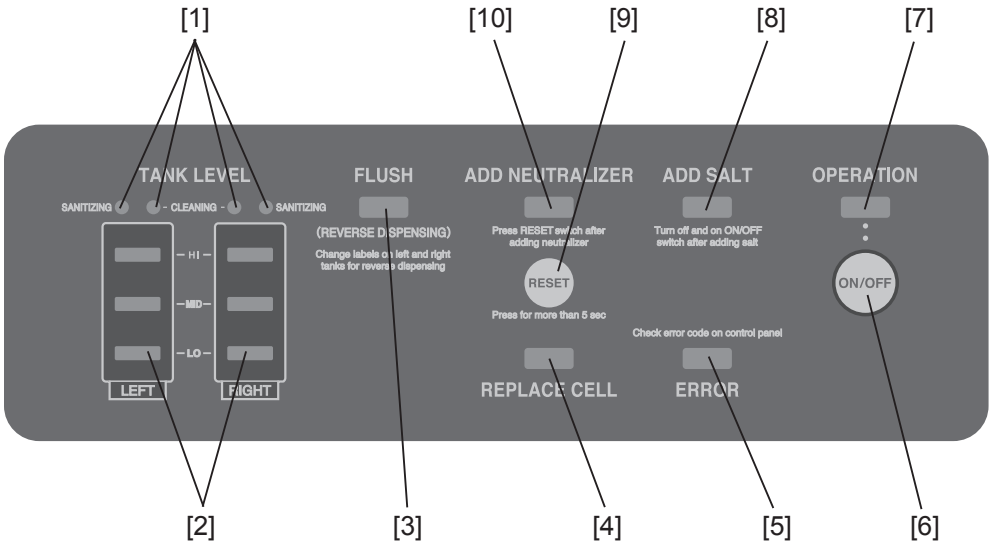
[26] Main Control Board
Functions as the brain of the controls to command inputs. Common between ROX-30SA-E and ROX-60SA-E with model identification by provision of CN37 connector (ROX-30SA-E: provided, ROX-60SA-E: not provided). Replacement of the main control board for ROX-30SA-E will require reconnection of the CN37 connector to the new board.

[27] DC Power Supply (Electrolytic Cell)
DC power supply for electrolysis in the electrolytic cell. Output voltage 12V.

[28] Earth Leakage Breaker
Shuts off the primary power supply in case of earth leakage or overcurrent.

[29] Control Panel
Allows various settings of the electrolytic cell functions. Provided on the right side only for ROX-30SA-E.

[e] OPERATION PANEL

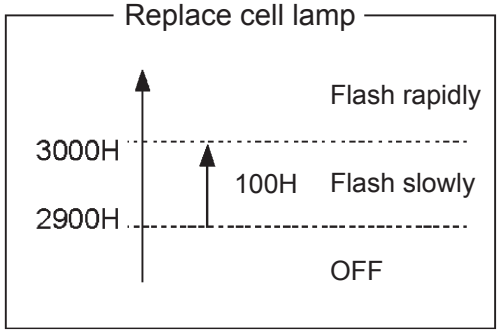


[1] Electrolyzed Water Lamp (blue = cleaning water, red = sanitizing water)
Indicates the type of water stored in the tank.

[2] Tank Level Lamp (green)
Indicates the water level for each tank in three steps. Electrolyzed water is not available if this lamp is off.

[3] Flush (Reverse Dispense) Lamp (blue)
The sanitizing and cleaning water outlets are switched while this lamp is on. Check with the electrolyzed water lamp.

[4] Replace Cell Lamp (red)
Flashes when the electrolytic cell needs to be replaced.



* Electrolysis will not stop after 3000 hours.

[5] Error Lamp (red)
Comes on or flashes in case of trouble.

[6] ON/OFF Switch
Starts and stops electrolyzing water.

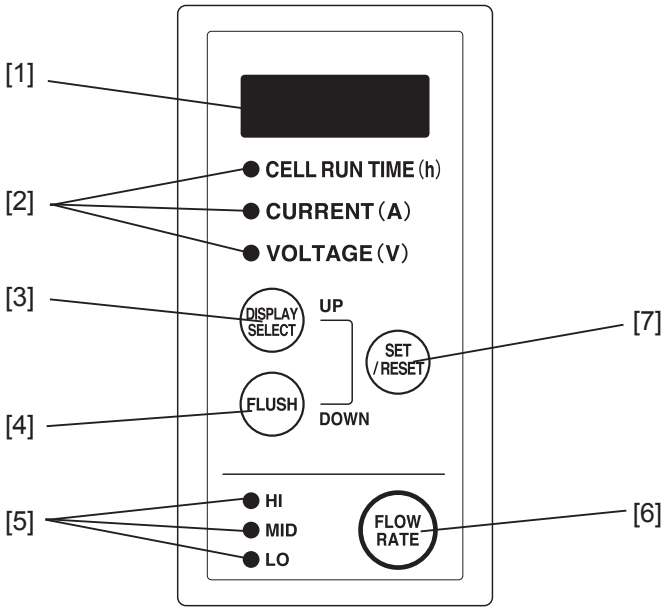
[7] Operation Lamp (green)
Stays on while the unit is in operation. (ROX-60SA-E: Flashes when one unit is off.)

[8] Add Salt Lamp (red)
Comes on when the salt water tank is running out of salt.

[9] Reset Switch
Resets the add neutralizer lamp.

[10] Add Neutralizer Lamp (red)
Flashes when the neutralizer is getting empty.

[f] CONTROL PANEL (A) (B) [ROX-30SA-E: Control panel (A) only]



[1] Display
Indicates the cell run time, current, voltage, and error code in case of trouble.

[2] Display Lamp (red)
Indicates the displayed item.

[3] Display Select Button
For use by a trained operator and service personnel only.

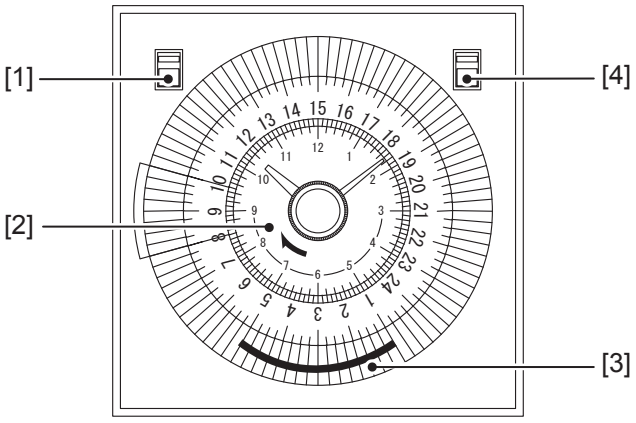
[4] Flush Button
Press to flush the electrolyzed water circuit. The flush lamp on the operation panel stays on while flushing.

[5] Flow Rate Lamp (red)
Indicates the current flow rate.

[6] Flow Rate Button
Adjusts the flow rate of both sanitizing water and cleaning water.
Reference: HI = for utensil, MID = for food, LO = for food

[7] Set/Reset Button
For use by a trained operator and service personnel only.

[g] WATER SOFTENER TIMER



[1] Contact Select Switch
Keep in the “AUTO” position.

[2] Time Indicator
Indicates the present time.

[3] Set Switch
Sets the water softener regeneration time. Regeneration begins at the red time zone.

[4] Frequency Select Switch
Set to your local frequency.

4. FUNCTIONS AND OPERATION

The control panel allows selections and settings of three different modes - normal, adjustment and check. To select a mode, hold down the set/reset button and press the display select button. The mode changes Nor. (normal) > Adj. (adjustment) > CHE. (check) > Nor. (normal) every time the button is pressed.

[a] NORMAL MODE

The following menus are available in the normal (Nor.) mode.

No.	Menu	Description
1	Cell run time (h)	Total electrolytic cell run time at present.
2	Current (A)	Current flowing in electrolytic cell at present as measured by current sensor.
3	Voltage (V)	Voltage provided on electrolytic cell at present as measured by main control board.

[b] ADJUSTMENT MODE

The following menus are available in the adjustment (Adj.) mode.
Press the display select button to show the desired number in the display, press the flush button to select the number, use the display select button and flush button as an up/down button to adjust the setting, and press the set/reset button to store the changed setting or press the display sellect button and flush button at the same time to cancel the adjustment.

No.	Menu	Factory default	Adjustable range/increments
A1	Current (A)	Lo: 10, Std: 10, Hi: 10	5.0 to 13.0/0.1 (wt=25°C)
A2	Voltage (V)	N/A	Skip (fixed at 12VDC)
A3	Total flow rate (L/min)	Lo: 3.0, Std: 4.0, Hi: 6.0	2.0 to 8.0/0.1
A4	Combination	N/A	Skip
A5	Portion control time (min)	N/A	Skip
A6	Cleaning water dispensing time for hand washing (s)	N/A	Skip
A7	Sanitizing water dispensing time for hand washing (s)	N/A	Skip
A8	Cell run time/reversal time reset	N/A	Display present run time, then hold down set/reset button (10s) to reset
A9	Initial flash time (s)	N/A	Skip (Std, 0 to 20/1)
A10	Cell replacement time (h)	3000	1500 to 9000/100
A11	Cell reversal time (h)	12	0.033 (check), 1 to 150/1
A12	Continuous dispensing protection time (min)	N/A	Skip
A13	Single nozzle	N/A	Skip

No.	Menu	Factory default	Adjustable range/increments
A14	Water temperature correction factor	4	0 to 8/1
A15	Flow rate adjustment factor, operation time factor	0.3	0.1 to 2.0/0.1
A16	Skip	N/A	Skip
A17	Flow rate correction value (L/min)	0	-0.5 to 0.5/0.1
A18	Water softener regeneration output cycle	6 (ROX-30SA-E) 12 (ROX-60SA-E)	0.1 to 20/0.1 (x 1000L)
A19	Salt water supply factor, feedback	0.3	3.0 to 10.5/0.5
A21	Raw water conductivity	100	Skip
A22	Salt water supply factor, initial non-electrolysis time (s)	5	Skip
A23	Salt water supply factor	5	0 to 75/5 (initial stroke)
A25	Salt water supply factor, stroke subtraction after reaching set point (times/s)	N/A	Skip
A26	Reset	N/A	Display "rSEt", then hold down set/reset button (10s) to reset
A27	Flow rate valve open/closed	N/A	Display current status
A28	Current sensor type (20A or 30A)	20	20, 30
A29	Sanitizing water neutralizing volume (x 1000L)	20	15 to 50/1

* Basically do NOT adjust the menus in gray.
* See "5. WATER SOFTENER" for button operations.

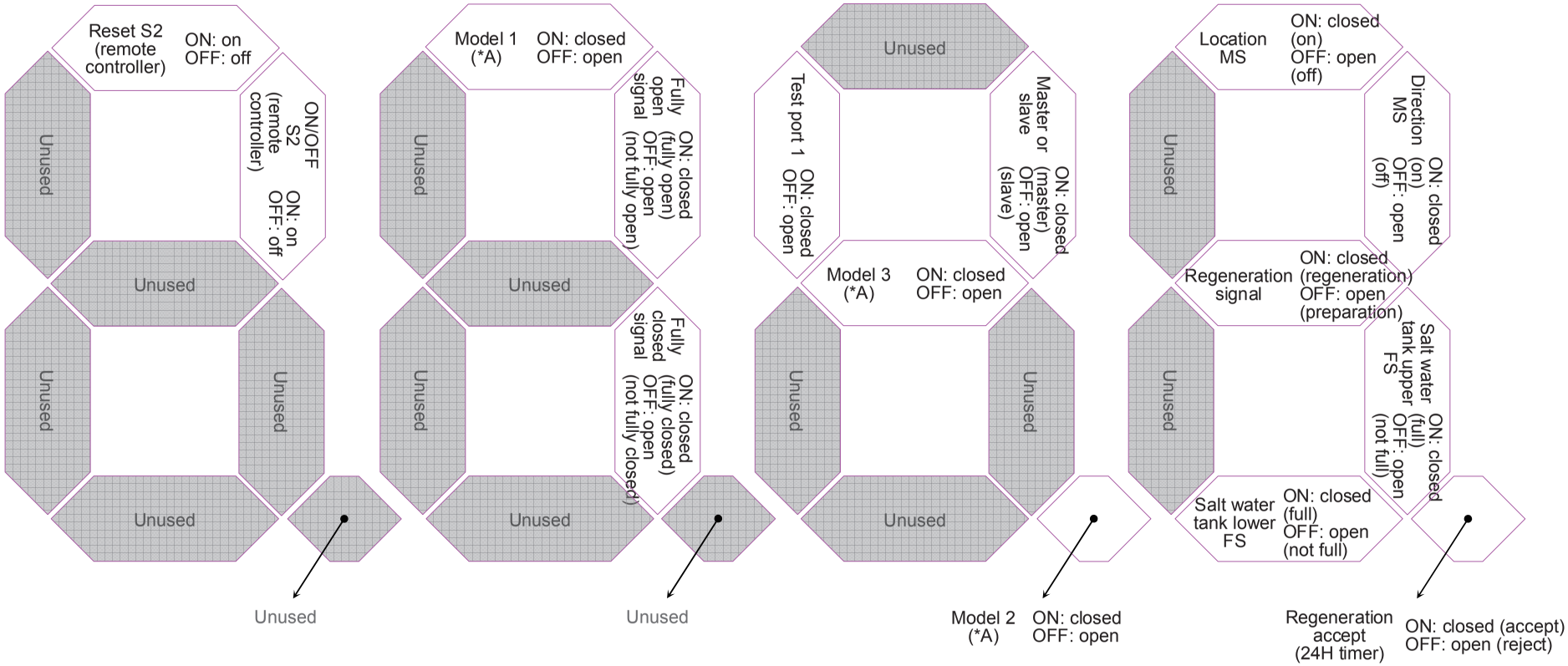
[c] CHECK MODE

The following menus are available for in the check (CHE.) mode.
Press the display select button to show the desired number in the display, press the flush button to select the number, and press the display sellect button and flush button at the same time to complete.

No.	Menu	Remarks
C1	Inputs	Right side only, see details below
C2	Inputs	Right side only, see details below
C3	Outputs	Right side only, see details below
C4	EH pump stroke (spm)	Amount of concentrated salt water supply, max. 720 shots/min
C5	Total flow rate (L/min)	Total flow rate in one cell
C6	Water temperature (°C)	Thermistor sensing temperature

No.	Menu	Remarks
C7	Set current at present water temperature (A)	Current after correcting water temperature variations
C8	Corrected current (A)	Current after correcting current sensor variations
C9	Elapsed cell reversal time (min)	
C10	Water flow after regeneration output (x 1000L)	
C11	Last error number	
C12	Cell run time at last error	
C13	Cell reversal time at last error	
C14	Current at last error	
C15	Voltage at last error	
C16	Total flow rate at last error	
C17	Salt water pump stroke at last error (spm)	
C18	Water temperature at last error (°C)	
C19	Set current at water temperature at last error (A)	
C20	Corrected current at last error (A)	
C21	Second from last error number	
C22	Cell run time at second from last error	
C23	Cell reversal time at second from last error	
C24	Current at second from last error	
C25	Voltage at second from last error	
C26	Total flow rate at second from last error	
C27	Salt water pump stroke at second from last error (spm)	
C28	Water temperature at second from last error (°C)	
C29	Set current at water temperature at second from last error (A)	
C30	Corrected current at second from last error (A)	
C31	Third from last error number	
C32	Cell run time at third from last error	
C33	Cell reversal time at third from last error	
C34	Current at third from last error	
C35	Voltage at third from last error	
C36	Total flow rate at third from last error	
C37	Salt water pump stroke at third from last error (spm)	
C38	Water temperature at third from last error (°C)	
C39	Set current at water temperature at third from last error (A)	
C40	Corrected current at third from last error (A)	
C41	Model configulation	ROX-30SA-E: 30 ROX-60SA-E (A side): 60-1 ROX-60SA-E (B side): 60-2
C42	Control board version	
C43	Sanitizing water neutralizing volume after regeneration (x 1000L)	

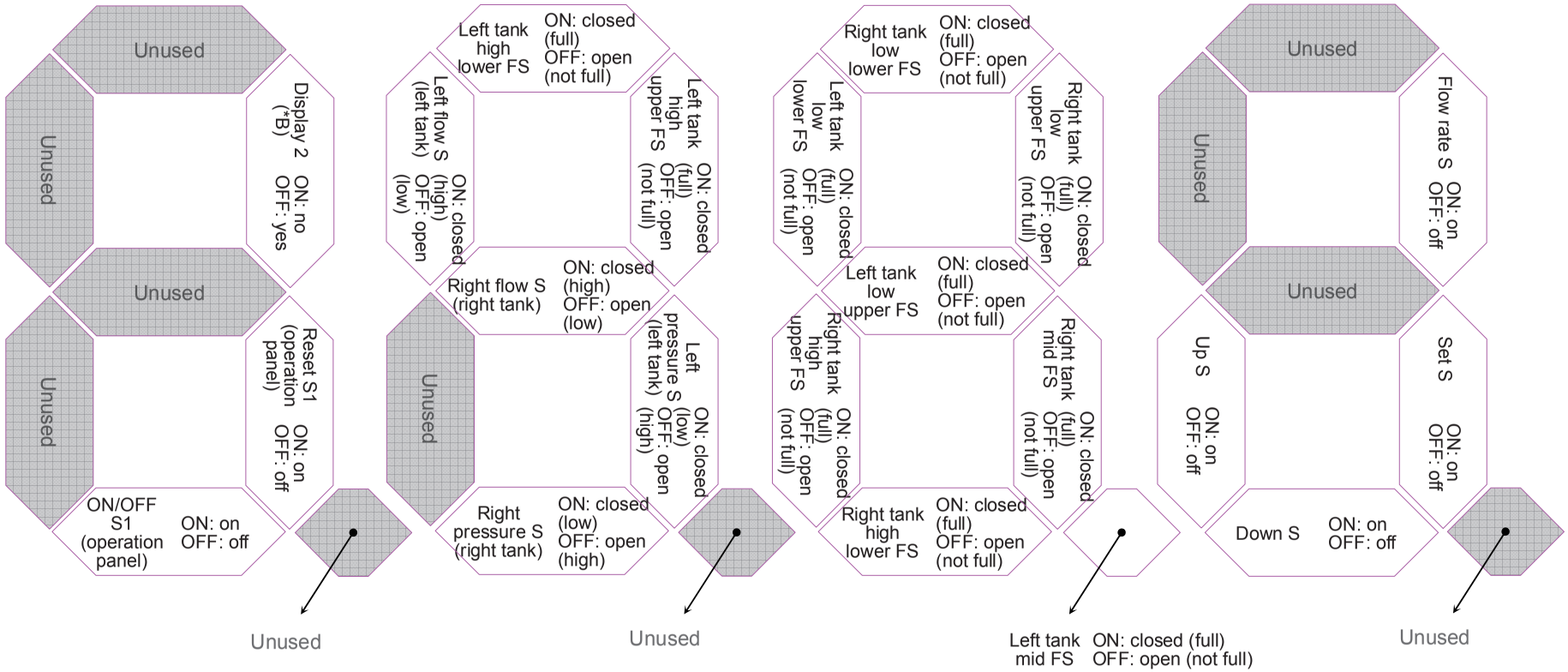
C1 (Inputs) Display



A. Model identification (Models 1 - 3)

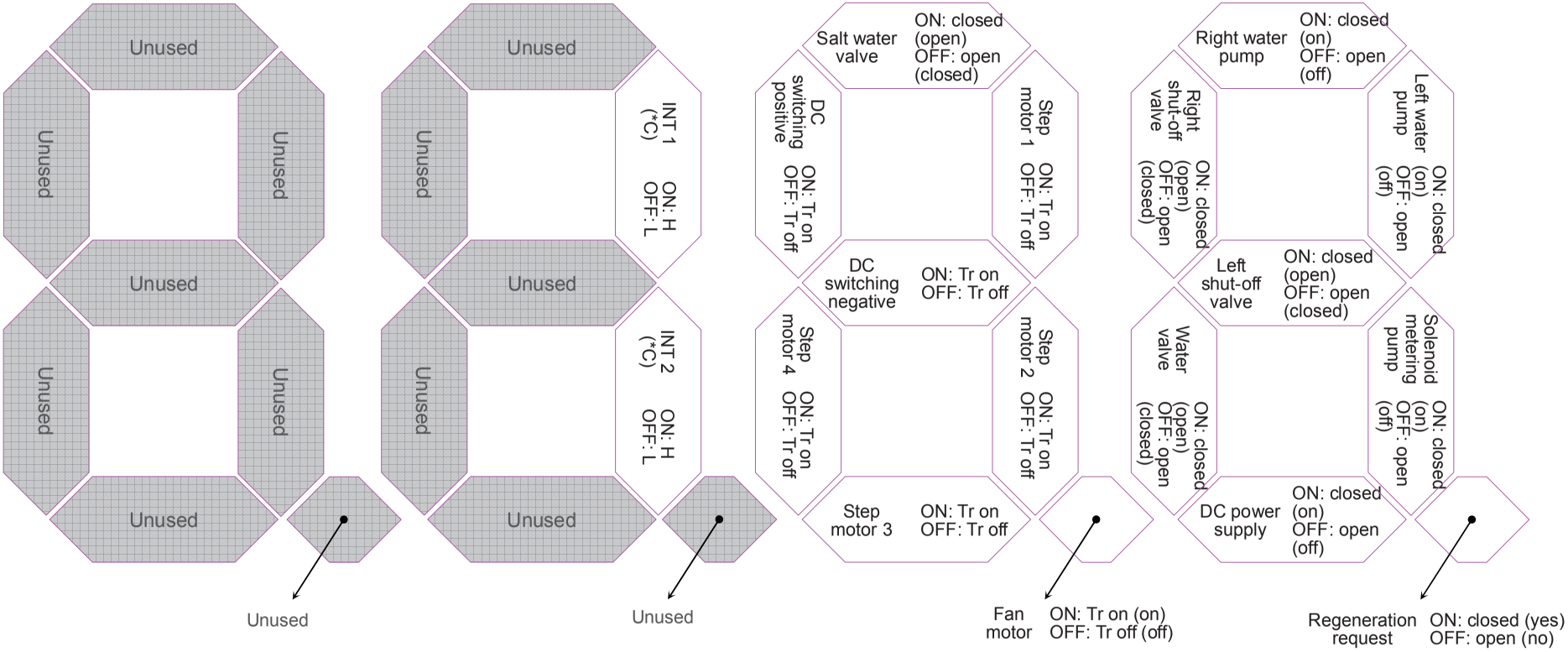
Model	Model 1	Model 2	Model 3
ROX-60SA-E	Contact open	Contact open	Contact open
ROX-30SA-E	Contact open	Contact open	Contact closed
Unknown	Combination other than above		

C2 (Inputs) Display


Unused
Unused
Unused
Unused
Display 2 (*B) ON: no OFF: yes
Reset S1 (operation panel) ON: on OFF: off
ON/OFF S1 (operation panel) ON: on OFF: off
Unused
Left tank high lower FS ON: closed (full) OFF: open (not full)
Left flow S (left tank) ON: closed (high) OFF: open (low)
Left tank high upper FS ON: closed (full) OFF: open (not full)
Right flow S (right tank) ON: closed (high) OFF: open (low)
Left pressure S (left tank) ON: closed (low) OFF: open (high)
Right pressure S (right tank) ON: closed (low) OFF: open (high)
Unused
Unused
Right tank low lower FS ON: closed (full) OFF: open (not full)
Left tank low lower FS ON: closed (full) OFF: open (not full)
Right tank low upper FS ON: closed (full) OFF: open (not full)
Left tank low upper FS ON: closed (full) OFF: open (not full)
Right tank high upper FS ON: closed (full) OFF: open (not full)
Right tank mid FS ON: closed (full) OFF: open (not full)
Right tank high lower FS ON: closed (full) OFF: open (not full)
Left tank mid FS ON: closed (full) OFF: open (not full)
Unused
Unused
Unused
Flow rate S ON: on OFF: off
Up S ON: on OFF: off
Set S ON: on OFF: off
Down S ON: on OFF: off
Unused

B. Whether operation panel (display 1) on body is connected with remote controller (display 2) or not.

C3 (Outputs) Display



C. Flow rate valve outputs

	Closed (reducing flow rate)	Open (raising flow rate)	Brake (turning off flow rate valve)	Stop (keeping flow rate valve off)
INT 1	ON	OFF	ON	OFF
INT 2	OFF	ON	ON	OFF

5. WATER SOFTENER

[a] DISCHARGE VOLUME

The discharge volume of the water softener is adjustable. Check your local water hardness and adjust the volume to the proper level. The water softener requires regeneration (to remove calcium and magnesium attached on the ion exchange resin inside) after discharging a specific volume of soft water.

Note: The discharge volume is factory adjusted to 6 tons for ROX-30SA-E and 12 tons for ROX-60SA-E.
For ROX-60SA-E, the adjustment must be made on the control panel (A).

1) Turn on the power switch (earth leakage circuit breaker).

2) Press and hold the set/reset button. When “Nor.” (normal) appears on the display, press the display select button. “Adj.” (adjust) appears on the display.

3) Release the set/reset button. “A1” (current) appears on the display.

   Note: If other than “A1” appears, press the set/reset button to have “A1” on the display.

4) Press the display select button until “A18” (water softener discharge volume) appears on the display.

   Note: If “A18” is passed on, press the set/reset button to go back to “A1”.

5) Press the flush button. The display shows “6” for ROX-30SA-E and “12” for ROX-60SA-E. Now the discharge volume is adjustable.

6) Use the UP/DOWN button (UP: display select button, DOWN: flush button) to adjust the discharge volume. The selected volume flashes on the display.

7) Press the set/reset button to set the volume. The display stops flashing and shows “A18”.

8) Press and hold the set/reset button, and press the display select button. “CHE.” (check) appears on the display.

9) Press and hold the set/reset button, and press the display select button. “Nor.” (normal) appears on the display.

10) Release the set/reset button to complete the adjustment.

To adjust the “A18” setting, refer to the following table and calculation formula.

Water Hardness and Regeneration Cycle

* Factory default in gray

Water hardness (mg/L)	Discharge volume (t)		Regeneration cycle (h)	
	ROX-30SA-E [flow rate 3L/min]	ROX-60SA-E [flow rate 6L/min]	ROX-30SA-E	ROX-60SA-E
30	10.0	20.0	27.8	27.8
40	7.5	15.0	20.8	20.8
50	6.0	12.0	16.7	16.7
60	5.0	10.0	13.9	13.9
70	4.3	8.6	11.9	11.9
80	3.8	7.5	10.4	10.4
90	3.3	6.7	9.3	9.3
100	3.0	6.0	8.3	8.3
110	2.7	5.5	7.6	7.6
120	2.5	5.0	6.9	6.9
130	2.3	4.6	6.4	6.4
140	2.1	4.3	6.0	6.0
150	2.0	4.0	5.6	5.6
160	1.9	3.8	5.2	5.2
170	1.8	3.5	4.9	4.9
180	1.7	3.3	4.6	4.6
190	1.6	3.2	4.4	4.4
200	1.5	3.0	4.2	4.2
210	1.4	2.9	4.0	4.0
220	1.4	2.7	3.8	3.8
230	1.3	2.6	3.6	3.6
240	1.3	2.5	3.5	3.5
250	1.2	2.4	3.3	3.3
260	1.2	2.3	3.2	3.2
270	1.1	2.2	3.1	3.1
280	1.1	2.1	3.0	3.0
290	1.0	2.1	2.9	2.9
300	1.0	2.0	2.8	2.8

Example

If the tap water hardness is 150 mg/L (ppm) (ROX-30SA-E):
(Default discharge volume) x {(Standard hardness) / (Local hardness)} = Local discharge volume
6.0 x { 50 / 150 } = 2.0
Therefore, the discharge volume must be adjusted to 2.0 tons.

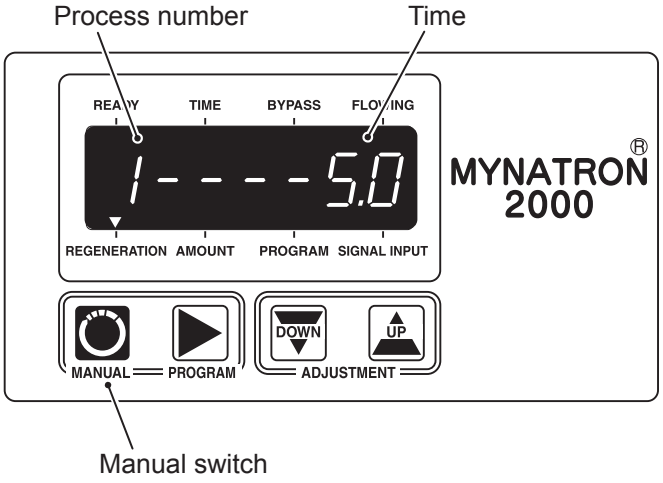
[b] REGENERATION PROCESS

No.	Process	Reference: factory default (external input)
1	Backwash	5 min
2	Recharge / displace	60 min
3	Rinse	5 min
4	Refill	3 min

* The processes 2 and 3 can be skipped at the time of installation. When the process number stops flashing and stays on, press the manual switch to proceed to the next process.

* There is no problem with the equipment operation even if the time in the display differs from the present time.

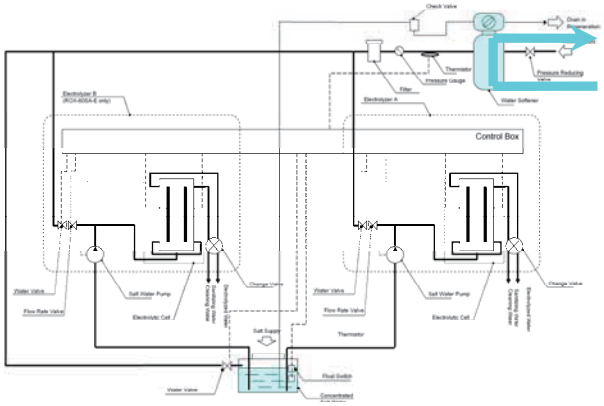
* Do not change the program of the water softener or press the switches other than the manual switch.



1.

Backwash

(5 min)

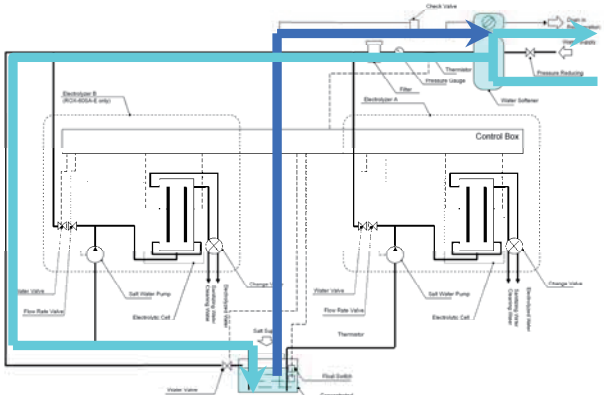


Reverse water flow to soak resign beads.

2.

Recharge / displace

(60 min)

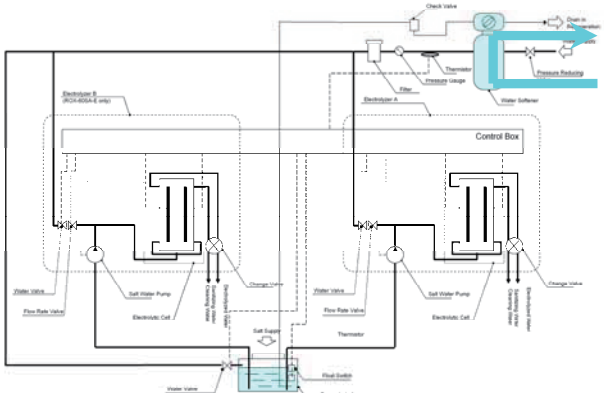


Feed salt water to wash resin beads with:
1 tank full of salt +
salt water valve open for
6 min (ROX-30SA-E) or
10 min (ROX-60SA-E).

3.

Rinse

(5 min)

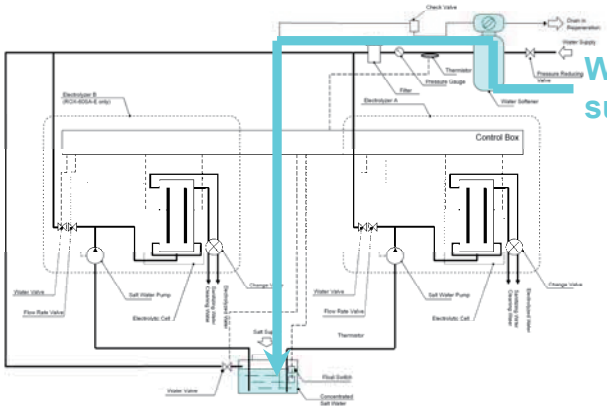


Rinse off salt water.

4.

Refill

(3 min)



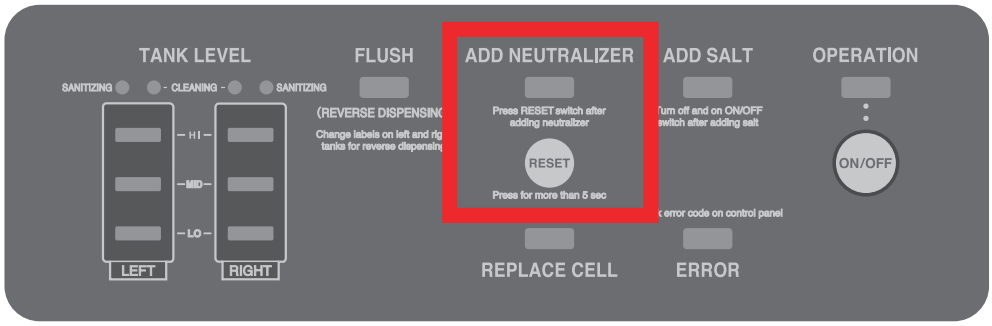
Open check valve.
Feed water into salt water tank.

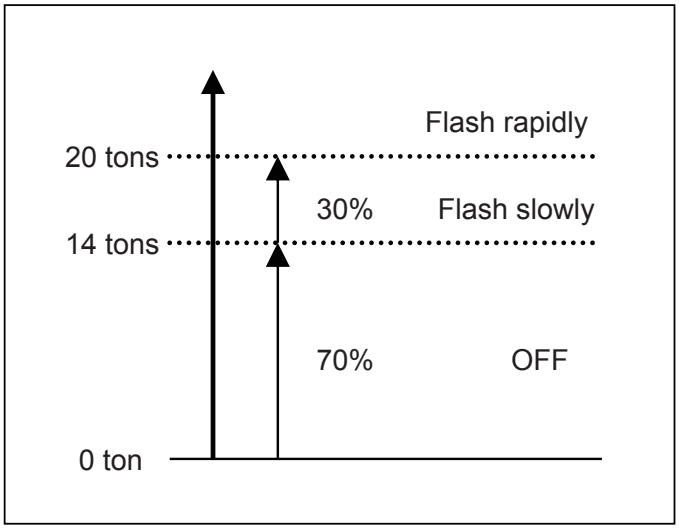
6. NEUTRALIZER

* The add neutralizer lamp flashes after a specific time estimated from sanitizing water overflow. The lamp may not start flashing when the neutralizer actually gets empty.

* The neutralizing agent is limestone consisting of almost pure calcium carbonate (CaCO3). Based on experimental data, approximately 300g of limestone is consumed per ton of sanitizing water overflow.
  $2HCl + CaCO_3 \rightarrow CaCl_2 + H_2O + CO_2$

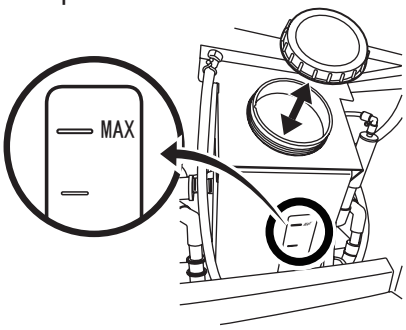
* The add neutralizer lamp starts flashing rapidly after 20 tons of sanitizing water overflow (factory default), then the unit automatically stops production (To restart the unit, hold down the reset switch on the operation panel for more than 5 seconds, then press the ON/OFF switch). To encourage supply of the neutralizing agent, the add neutralizer lamp starts flashing slowly after 14 tons of overflow, that is, 70% of 20 tons.



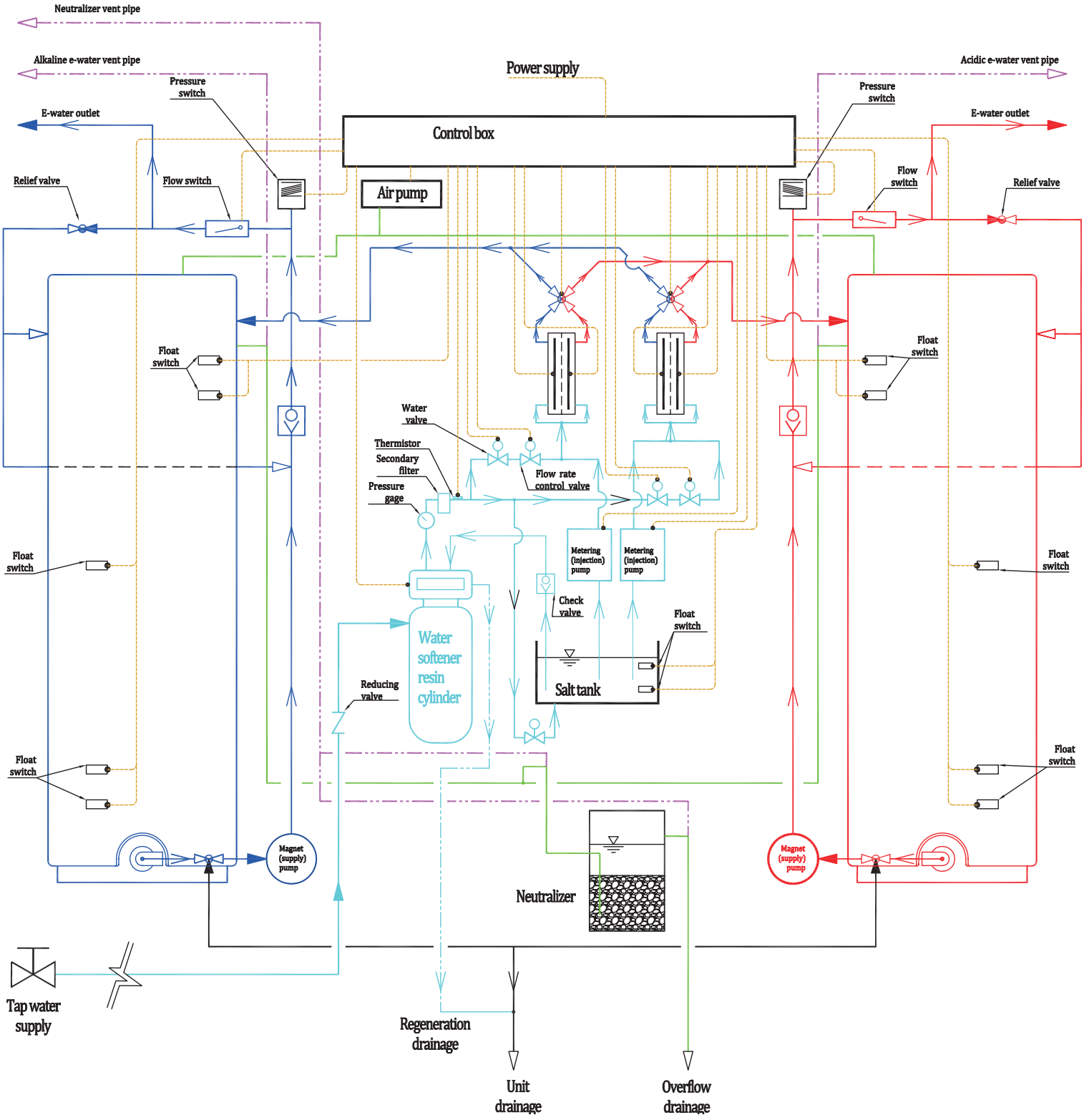


Sanitizing water overflow and add neutralizer lamp

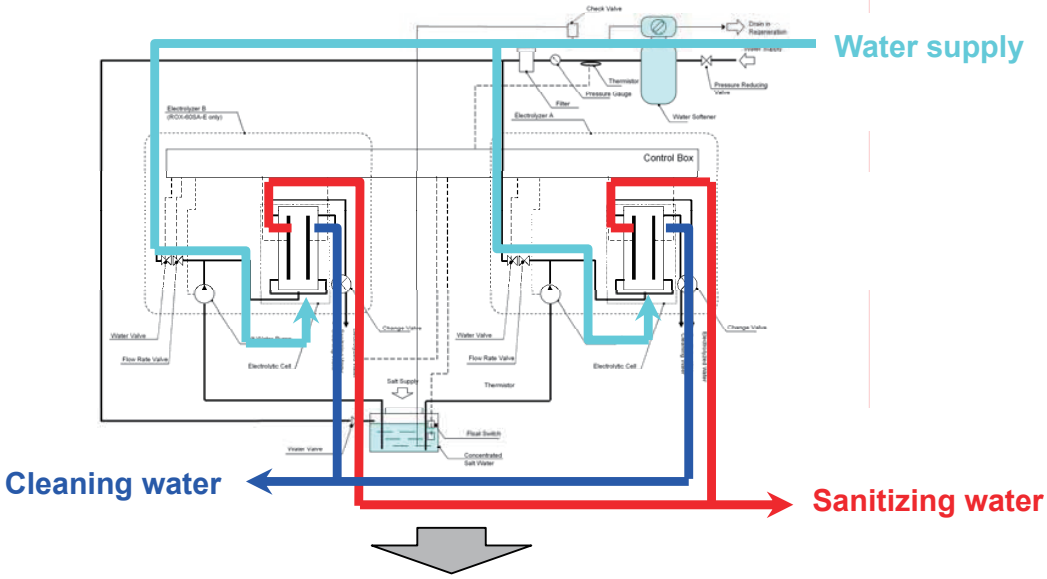
* After adding the neutralizing agent (up to the "MAX" line of the neutralizer), be sure to hold down the reset switch on the operation panel for more than 5 seconds to reset the count of sanitizing water overflow.



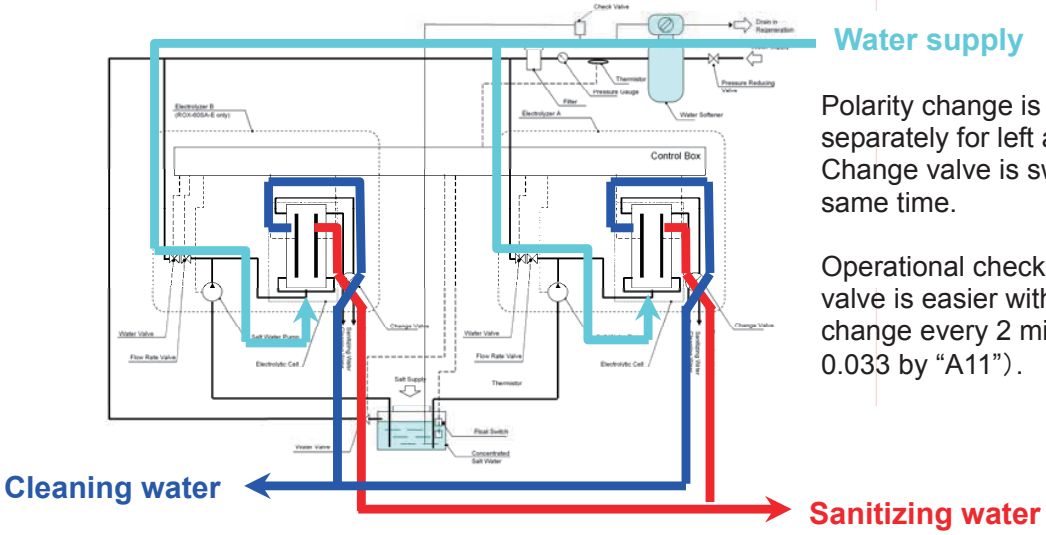
7. WATER CIRCUIT



1. Normal operation (no polarity change)



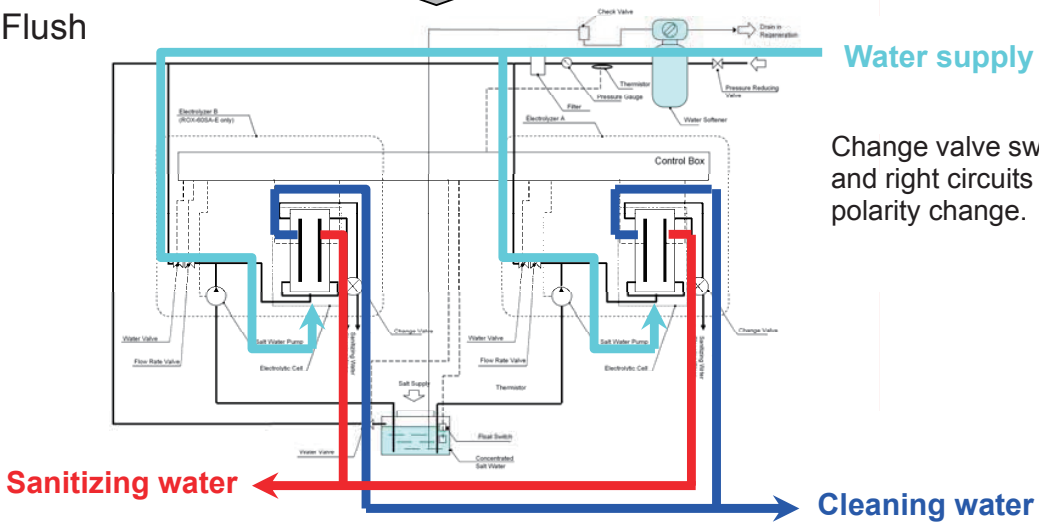
2. Normal operation (polarity change (automatically every 12h))



Polarity change is made separately for left and right cells. Change valve is switched at the same time.

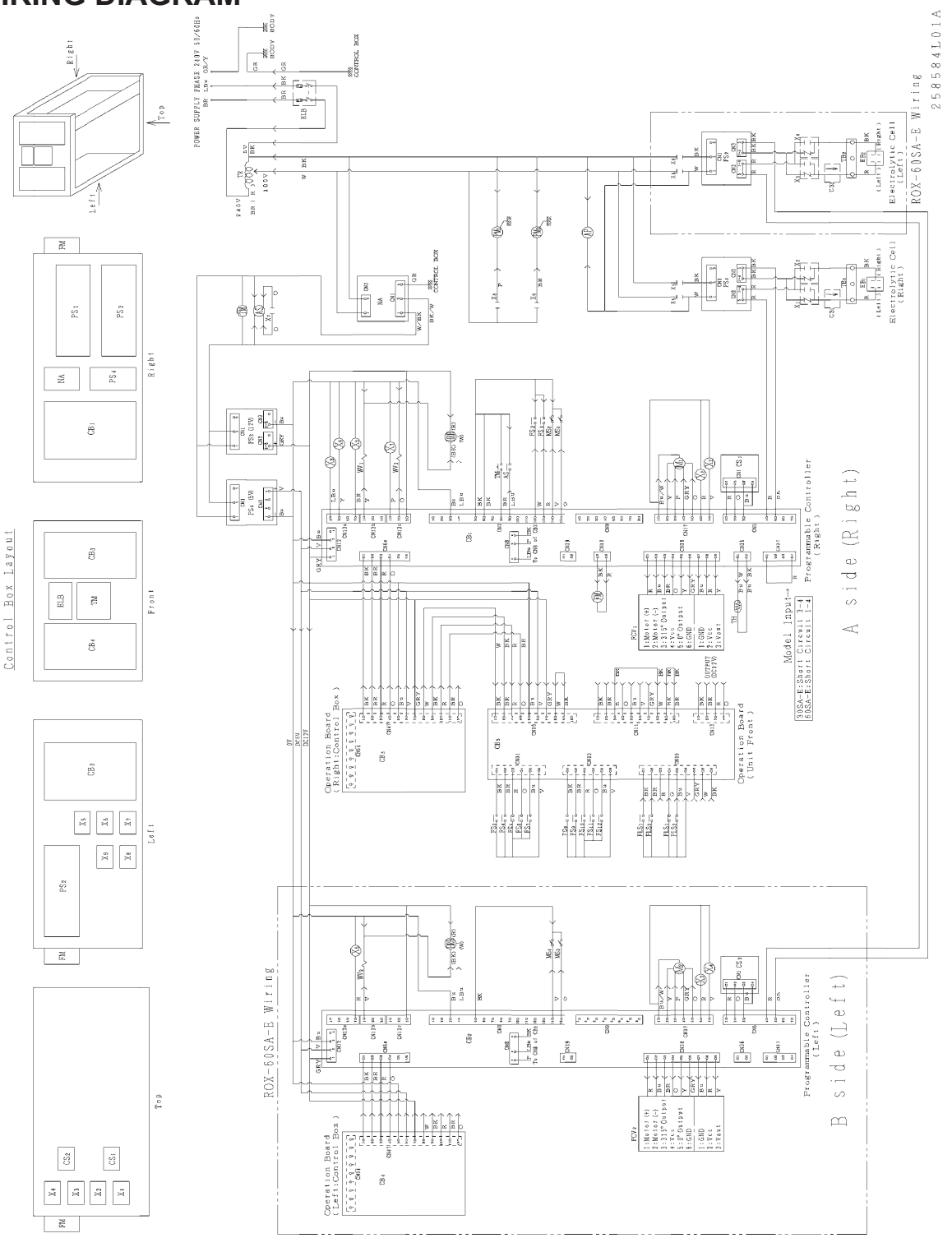
Operational check of change valve is easier with polarity change every 2 min (adjust 0.033 by “A11”).

3. Flush



Change valve switches left and right circuits with no polarity change.

8. WIRING DIAGRAM



Controller
ELB Ground Fault Interrupter
X1,3 Relay (Right:Polarity Change)
X2,4 Relay (Left:Polarity Change)
X5 Relay (Right:Electrode Output)
X6 Relay (Left:Electrode Output)
X7 Relay (Softener Output)
X8 Relay (Right:Pump Output)
X9 Relay (Left:Pump Output)
PS1 DC Power Supply(Right:Cell 12VDC)
PS2 DC Power Supply(Left:Cell 12VDC)
PS3 DC Power Supply Board 5VDC)
PS4 DC Power Supply Board 5VDC)
CB1 Programmable Controller(Right)(Master)
CB2 Programmable Controller(Left)(Slave)
CB3 Operation Board(Right:Control Box)
CB4 Operation Board(Left:Control Box)
CS1 Current Sensor(Right:Cell)
CS2 Current Sensor(Left:Cell)
NA Noise Absorber
TM Timer
FM Fan Motor(Control Box)

Unit Components
CB5 Operation Board(Unit Front)
HEP1 Salt Water Pump(Right)
HEP2 Salt Water Pump(Left)
ES1 Electrode(Right)
ES2 Electrode(Left)
M1 Flow Change Motor(Right)(Sanitizing-Cleaning)
M2 Flow Change Motor(Left)(Sanitizing-Cleaning)
MS1 Flow Change Switch(Right:Location Check M1)
MS2 Flow Change Switch(Right:Direction Check M1)
MS3 Flow Change Switch(Left:Location Check M2)
MS4 Flow Change Switch(Left:Direction Check M2)
PCV1 Flow Rate Control Valve(Right)
PCV2 Flow Rate Control Valve(Left)
WV1 Water Valve(Right:Cell)
WV2 Water Valve(Left:Cell)
WV3 Water Valve(Salt Tank)
TH Thermistor(Water Pump)
TB1 Terminal Block(Right)
TB2 Terminal Block(Left)
AS Water Softener
AP Air Pump

Unit Components
PM1 Pump Motor(Right:Sanitizing Water Tank)
PM2 Pump Motor(Left:Cleaning Water Tank)
FLS1 Flow Rate Switch(Right:Pump)
FLS2 Flow Rate Switch(Left:Pump)
PLS1 Pressure Switch(Right:Pump)
PLS2 Pressure Switch(Left:Pump)
FS1 Float Switch(Salt Water Tank Hi)
FS2 Float Switch(Salt Water Tank Lo)
FS3 Float Switch(Right-Water Tank Upper Hi)
FS4 Float Switch(Right-Water Tank Hi)
FS5 Float Switch(Right-Water Tank Mid)
FS6 Float Switch(Right-Water Tank Low Lo)
FS7 Float Switch(Left-Water Tank Low Lo)
FS8 Float Switch(Left-Water Tank Upper Hi)
FS9 Float Switch(Left:Water Tank Hi)
FS10 Float Switch(Left:Water Tank Mid)
FS11 Float Switch(Left:Water Tank Lo)
FS12 Float Switch(Left:Water Tank Lower Lo)
TB Terminal Block
Wire Color Secondary colors
Primary colors

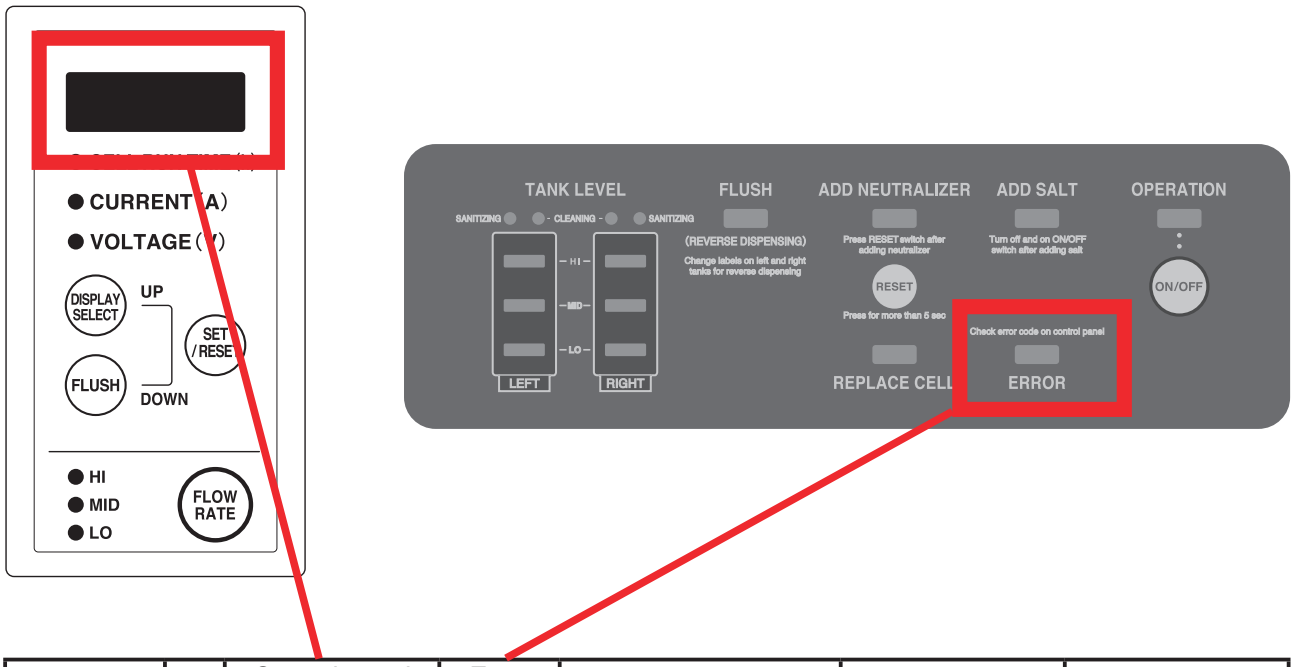
III. SERVICE INFORMATION

1. MAINTENANCE/INSPECTION

Check the following items during maintenance or inspection in normal condition. If any abnormality or defect is found, repair, replace or adjust it properly.

No.	Inspection		Remedy
	Item	Check	
1	Sanitizing water pH	Within specified range?	Check with pH test paper.
2	Cleaning water pH	Within specified range?	Check with pH test paper.
3	Available chlorine concentration (sanitizing water)	Within specified range?	Check with o-Tolidine.
4	Flow rate (sanitizing/cleaning water)	Within specified range?	Check with beaker.
5	Ambient temperature	Within specified range?	Check with thermometer.
6	Water supply temperature	Within specified range?	Check with thermometer.
7	Water supply pressure	Within specified range?	Check with water pressure gauge.
8	Replace cell lamp	Flashing or stays on?	Visually check.
9	Earth Leakage Circuit Breaker	Trips when test button is pressed?	Check.
10	Salt water tank	No dirt buildup?	Visually check.
		No salt deposit at bottom?	Visually check.
11	Filter	Not clogged with dirt?	Visually check.
12	Earth wire	Not damaged or loose?	Visually check.
13	Attachment plug	Securely plugged in?	Visually check.
		Not hot?	Check.
14	Exterior	Clean?	Visually check.
15	Water circuit	No water leak?	Visually check.
16	Water softener	Water softened?	Check water sample.
		Working properly?	Check.
		Set to regenerate while unit is out of service?	Check.
		Proper salt level?	Check.
17	Cartridge filter	Pressure difference within specified range?	Visually check.
18	Water outlets	Not blocked?	Visually check.
		Working properly?	Check.
19	Labels	Firmly attached?	Visually check.

2. ERROR CODES



Error	No.	Control panel display	Error lamp	Problem	Operation	Reset
Low water	E11	Error no.	Flash	Flow rate stayed below 1.5L/min for 10 sec with water valve on	Production stops after water valve turns off twe times	Remove cause and press ON/ OFF switch
Flow rate valve	E12	Alternate between normal display and error no.	On	Fully closed valve, set flow rate, or fully open valve not detectable for 12 sec	Production continues	Automatically reset even in operation if cause is removed
Water shutoff	E14	Error no.	Flash	Flow rate stayed above 1.5L/min for 10 sec with water valve off	Production stops after water valve turns on twe times	Remove cause and press ON/ OFF switch
Salt water tank supply	E31	Alternate between normal display and error no.	Flash	Salt water tank did not fill up after 30 min of water supply	Production continues	Remove cause and press ON/ OFF switch
DC relay contact	E53	Error no.	Flash	Current stayed below 0.5A for 2 sec	Production stops after relay switches three times	Remove cause and press ON/ OFF switch
Flow switching valve	E61	Error no.	Flash	Switching did not complete within 30 sec	Production stops	Remove cause and press ON/ OFF switch
Thermistor	E74	Alternate between normal display and error no.	On	Open circuit (-30°C) or short circuit (60°C)	Production continues as 5° C (open circuit) or 30°C (short circuit)	Automatically reset even in operation if cause is removed
Salt water tank float switch	E81	Alternate between normal display and error no.	On	Upper switch on, lower switch off	Production continues	Automatically reset even in operation if cause is removed

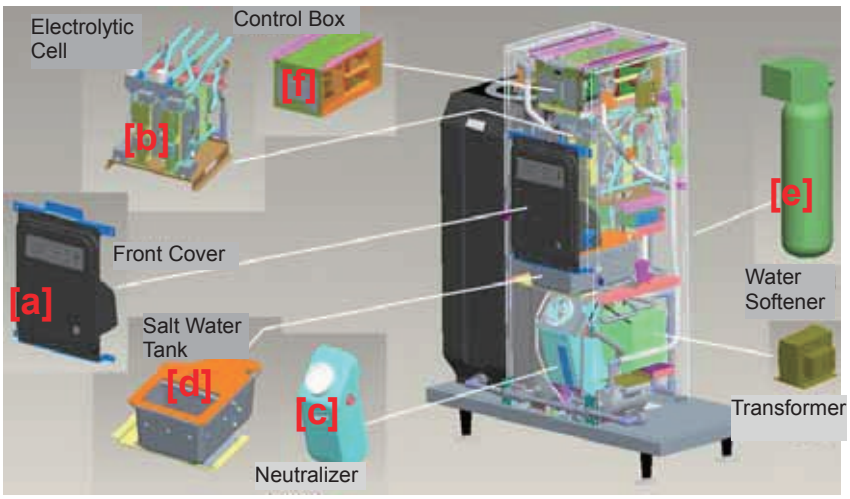
Error	No.	Control panel display	Error lamp	Problem	Operation	Reset
Water tank high float switch	E82	Alternate between normal display and error no.	On	Upper switch on, lower switch off	Production continues (for at least 3 min)	Automatically reset even in operation if cause is removed
Water tank low float switch (pumping protection)	E85	Alternate between normal display and error no.	On	Upper switch on, lower switch off	Production continues	Automatically reset even in operation if cause is removed
Water softener regeneration	E91	Alternate between normal display and error no.	On	No regeneration signal, regeneration did not complete within 90 min	Production continues	Automatically reset even in operation if cause is removed
Pumping function	E92	Alternate between normal display and error no.	Flash	Flow rate switch turned off with water pump on or turned on with water pump off	Pumping stops after restarted three times	Remove cause and press ON/ OFF switch
Model setting	EE1	Error no.	Off	Model setting or communication connector in bad or wrong connection, slave circuit open	Production and pumping stop	Remove cause and press ON/ OFF switch
Control board	EF0	Error no.	On	EEPROM error	Production and pumping stop	Remove cause and press ON/ OFF switch
Control board	EF1	Alternate between normal display and error no.	Off	Check SUM error	Production continues (stops with power on), pumping available	Automatically reset even in operation if cause is removed
Salt water level	—	(Add salt lamp on)	Add salt	Salt water pump stayed at 720 spm for 90 sec	Production stops	Add salt and press ON/OFF switch
Replace cell	—	(Replace cell lamp flashes slowly)	Replace cell	Cell run time exceeded 2900 hours (factory default)	Production continues	Replace cell, select "A8", hold down set/reset button for 10 sec, and turn on/off power switch
Replace cell	—	(Replace cell lamp flashes rapidly)	Replace cell	Cell run time exceeded 3000 hours (factory default)	Production continues	Replace cell, select "A8", hold down set/reset button for 10 sec, and turn on/off power switch
Add neutralizer	—	(Add neutralizer lamp flashes slowly)	Add neutralizer	Sanitizing water neutralization volume exceeded 14 tons (factory default)	Production continues	Add neutralizer, hold down reset switch for 5 sec, and press ON/ OFF switch
Add neutralizer	—	(Add neutralizer lamp flashes rapidly)	Add neutralizer	Sanitizing water neutralization volume exceeded 20 tons (factory default)	Production stops	Add neutralizer, hold down reset switch for 5 sec, and press ON/ OFF switch

3. SERVICE DIAGNOSIS

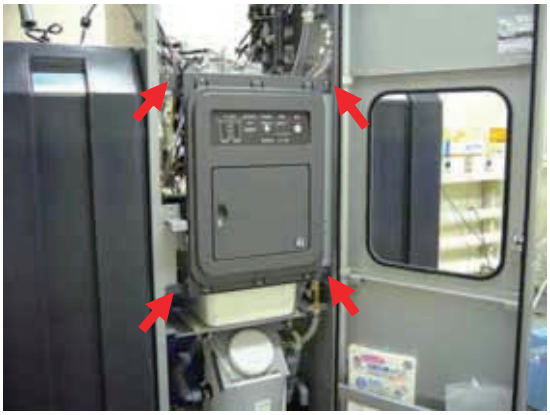
Error	Problem	Check	Possible cause	Remedy
E11 (low water)	Flow rate sensor detected flow rate below 1.5L/min for 10 sec with water valve on	Water supply line	Water failure	Recover water supply
		Electrolyzed water outlet	Blocked	Unblock
		Joint hose	Crushed or bent	Correct
			Scaled	Replace
		Filter	Clogged	Unclog
		Water valve	Clogged	Unclog
			Connector in bad contact	Correct
			Defective	Repair or replace
		Flow rate sensor	Clogged	Unclog
			Connector in bad contact	Correct
			Defective	Repair or replace
E12 (flow rate valve)	Fully closed valve, set flow rate, or fully open valve was not detectable for 12 sec when flow rate changed	Flow rate valve	Connector in bad contact	Correct
			Defective	Repair or replace
E14 (water shutoff)	Flow rate sensor detected flow rate above 1.5L/min for 10 sec with water valve off	Water valve	Defective	Repair or replace
			Clogged	Unclog
E31 (salt water tank supply)	Salt water tank did not fill up after 30 min of water supply	Water valve	Clogged	Unclog
			Connector in bad contact	Correct
			Defective	Repair or replace
		Float switch	Jammed	Unjam
			Defective	Repair or replace
		Overflow pipe	Improperly attached	Correct
			Damaged	Repair or replace
E53 (DC relay contact)	Electrolytic current stayed below 0.5A for 2 sec	Current sensor	Defective	Repair or replace
			Signal line open circuit	Correct
		DC power supply	Defective	Repair or replace
		Cell wiring	Red and black wires swapped	Correct
			Open circuit	Repair or replace
E61 (flow switching valve)	Switching did not complete within 30 sec	Gear motor	Defective	Repair or replace
		Location microswitch	Defective	Repair or replace
		Direction microswitch	Defective	Repair or replace
E74 (thermistor)	Open circuit (-30°C) or short circuit (60°C) was detected	Thermistor	Defective	Repair or replace
E81 (salt water tank float switch)	Upper float switch turned on and lower float switch turned off during production	Float switch	Defective	Repair or replace
E82 (water tank high float switch)	Upper high float switch (top) turned on and lower high float switch (2nd from top) turned off	Float switch	Defective	Repair or replace

Error	Problem	Check	Possible cause	Remedy
E85 (water pump float switch)	Upper low float switch (bottom) turned on and lower low float switch (2nd from bottom) turned off	Float switch	Defective	Repair or replace
E91 (water softener regeneration)	Water softener regeneration did not complete within 90 min	Water softener	Defective	Repair or replace
E92 (pumping)	Flow rate switch turned off with water pump on or turned on with water pump off	Water pump	Vapor lock	Correct
			Defective	Repair or replace
		Flow rate switch	Defective	Repair or replace
		Pressure switch	Defective	Repair or replace
		Drain valve	Closed	Switch to pumping
EE1 (model recognition)	Model setting or control board connector in bad or wrong connection	Model setting connector on control board	Bad contact	Correct
		Control board wiring	Open circuit	Repair or replace
EF0 (control board)	EEPROM error	Control board	Defective	Repair or replace
EF1 (control board)	Check SUM error	Control board	Defective	Repair or replace

4. REMOVAL AND REPLACEMENT OF COMPONENTS



[a] FRONT COVER

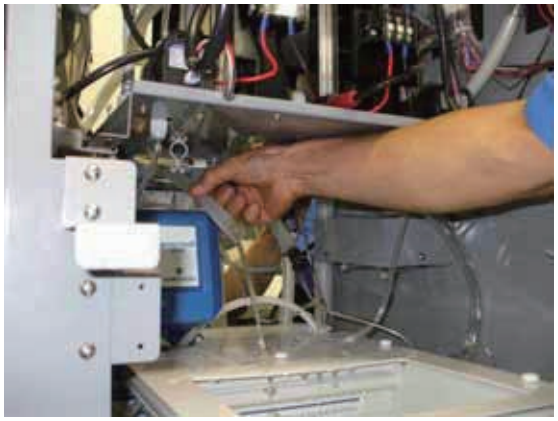


Loosen the two screws on the top of the front cover, and remove the two screws at the bottom (red arrows).

Remove the front cover, and hook it inside the door.

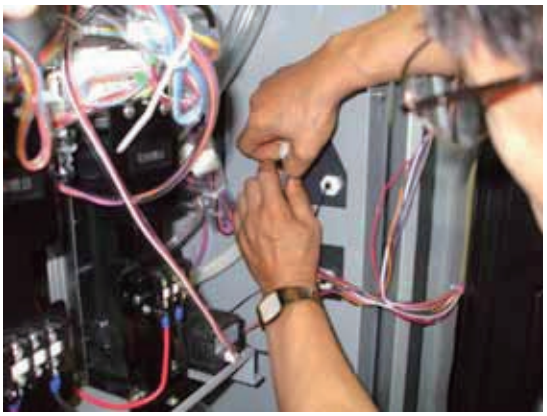
The operation panel becomes easily accessible during service and maintenance.

[b] ELECTROLYTIC CELL



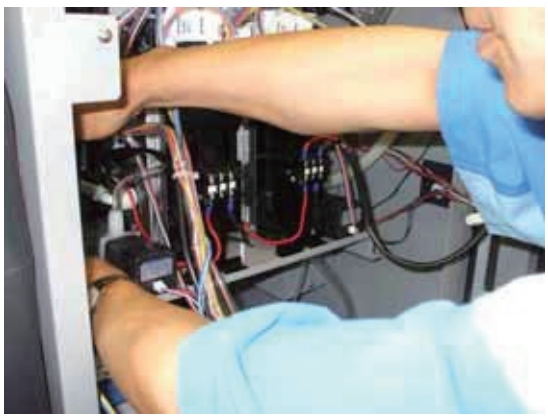
Drain the hose at the bottom of the cell.

Disconnect the wiring connectors.

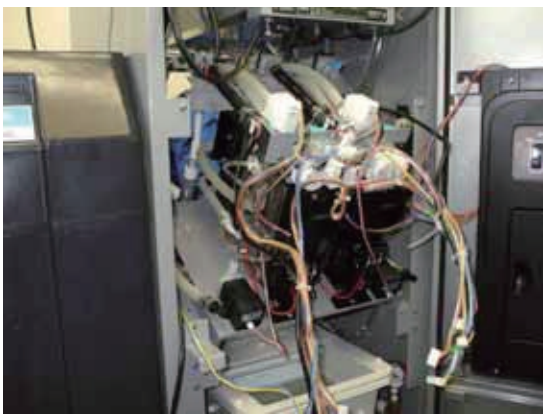


Disconnect the sanitizing and cleaning water hoses by pinching the end of the connector and pulling off the hose.

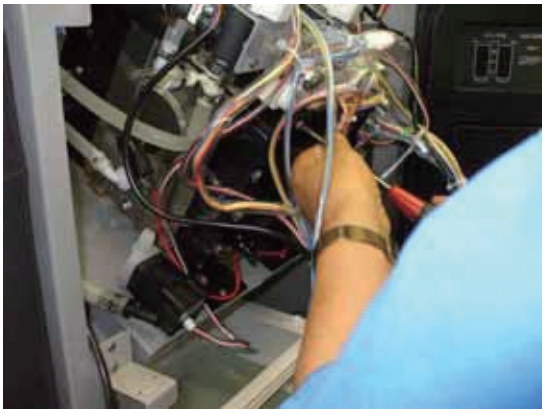
Remove the upper wiring screws from the cell terminal block.



Remove the screws at the four corners of the sheet metal cell base.



Pull out the cell together with the base.



Remove the bracket (three screws).

Use plumber’s pliers to disconnect the four hoses at the cell inlets and outlets.

Slide out the cell toward you.

[c] NEUTRALIZER

Remove the bracket (two screws).

Remove the cap from the end of the drain hose, and drain the neutralizer.

If the drain hose is clogged with limestone, use a hand oil pump or the like to drain the hose.

Remove the quick clamp from the neutralizer inlet and outlet.

Pull out the inlet and outlet pipes, and lift the neutralizer off the unit.

[d] SALT WATER TANK

Uncover the salt water tank (six screws).

Remove the tie and disconnect the hose from the right rear of the salt water tank (be sure to reconnect after service and maintenance).

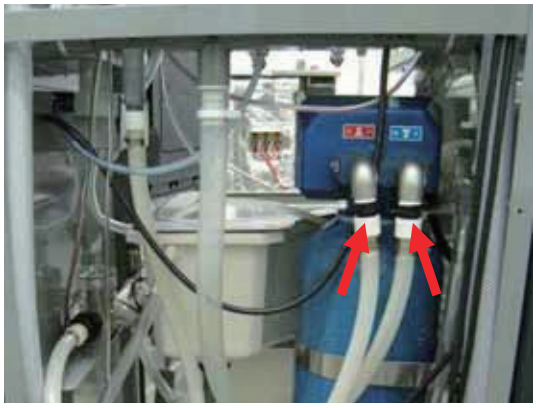
Turn the overflow pipe to the left to disconnect, and drain concentrated salt water.

Remove the four screws from the sheet metal part of the unit.

Remove the quick clamp from the bottom of the salt water tank, and disconnect the drain pipe.

Disconnect the float switch wiring connectors, and lift the salt water tank off the unit.

[e] WATER SOFTENER (* Remove neutralizer and salt water tank first)



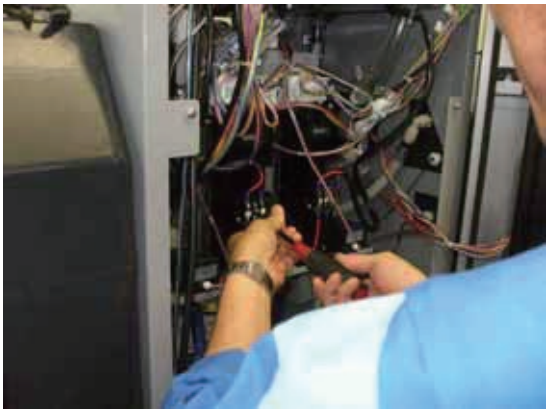
Depressurize the water circuit by turning on the power with water supply off. Use plumber's pliers to disconnect the pipes from the water softener.

Disconnect the metal band, and remove the water softener.

Use a rubber belt wrench to turn and disconnect the resin cylinder.

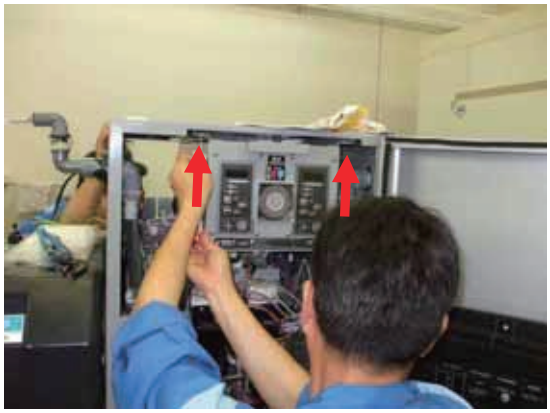
Replace the resin.

[f] CONTROL BOX



Remove the upper wiring screws from the cell terminal block.

Disconnect the wiring connectors.



Remove the two screws from the unit rail.

Slide out the control box toward you (heavy, be careful).

Turn the control box upside down, and place it on a table.

Remove the cover.

5. INSTALLATION AND SAFETY PRECAUTIONS

[a] VENT LINES

The vent lines must be installed to prevent health problems or damage to surrounding equipment (e.g. corrosion, tank burst with increasing internal pressure) caused by hydrogen gas or chlorine gas generated from electrolyzed water.

CAUTION

Run the sanitizing water, cleaning water, and neutralizer vent lines separately to the outside.

Cover the vent pipe ends with nets or bored end caps to protect against insects.

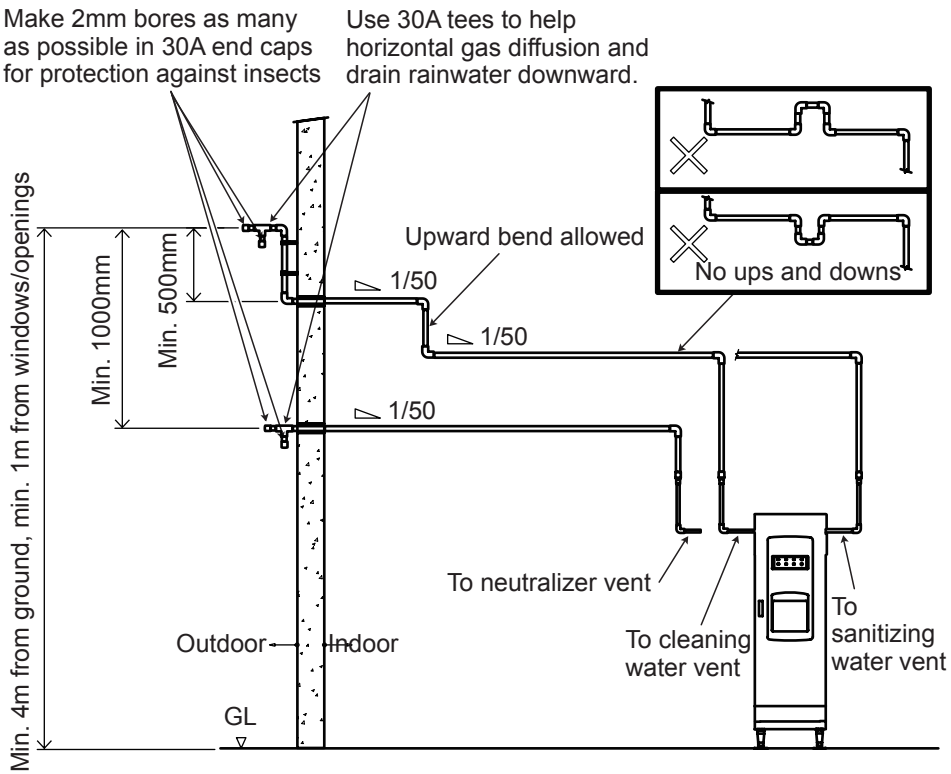
IMPORTANT

1. The sanitizing water, cleaning water, and neutralizer vent lines must be separate pipes.
2. The vent pipes must be sloped upward all the way to the ends without going up and down.
3. Do not use any metal weather cover at the vent pipe ends.
4. The vent pipes must be sized at least 30A.
5. Protect the vent pipe functions from snowfall, freeze-up, and flying objects.

Make the vent connections as shown below.

Note: The plumbing materials must be prepared on site.

Example



[b] NEUTRALIZER

The neutralizer must be supplied with a proper level of neutralizing agent (limestone). Otherwise, sanitizing water overflow runs out without being neutralized and may corrode the drain pipe or attack concrete.

[c] SALT

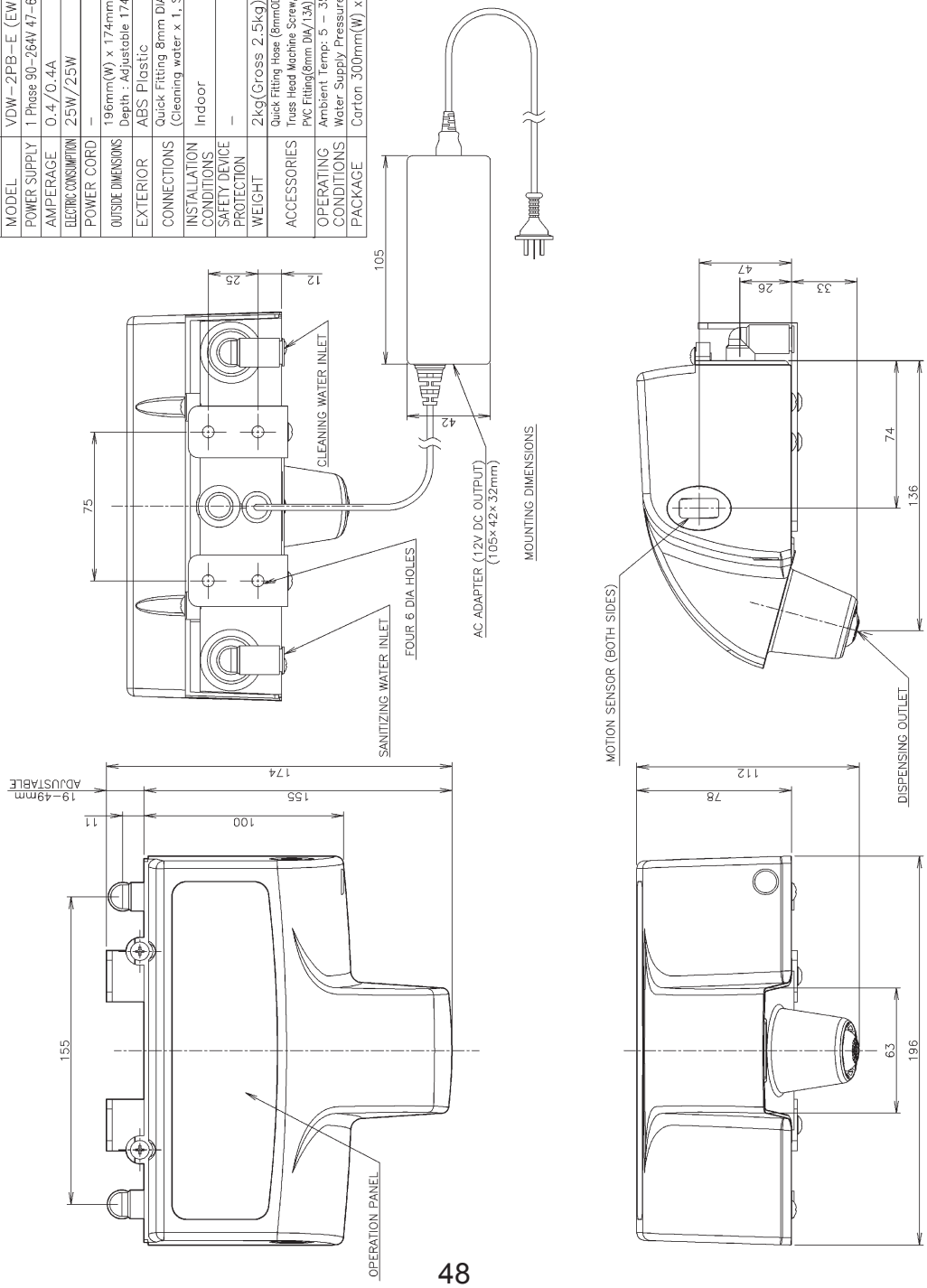
Do not leave spilled salt around the unit. The door and sheet metal parts inside the unit may corrode.

IV. AUTOMATIC DISPENSING VALVE VDW-2PB-E (OPTION)

The automatic dispensing valve VDW-2PB-E is a compact and stylish sensor operated valve to automatically dispense sanitizing water and cleaning water produced by the water electrolyzer. It can be installed on either the counter or the wall.

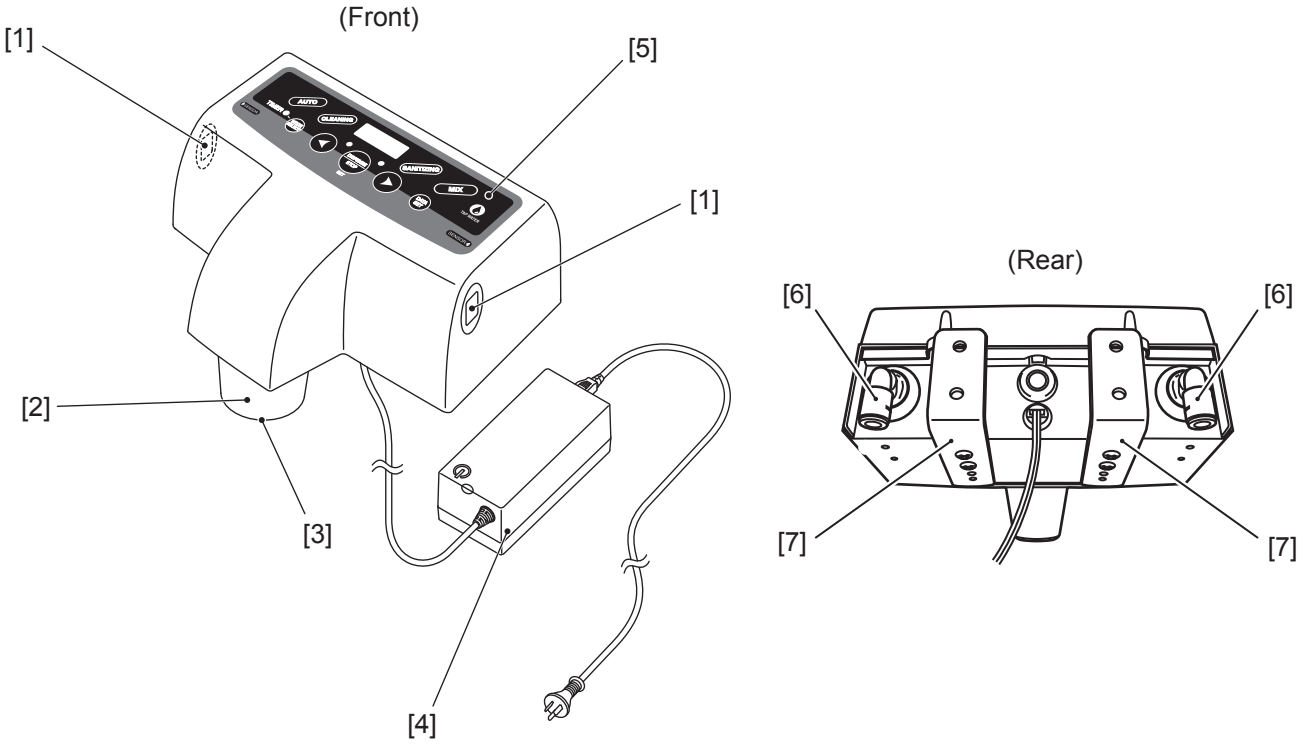
1. DIMENSIONS/SPECIFICATIONS

ITEM	Hoshizaki Automatic Dispensing Valve
MODEL	VDW-2PB-E (EW)
POWER SUPPLY	1 Phase 90–264V 47–63Hz 0.05KVA(Unit: 12V DC)
AMPERAGE	0.4/0.4A
ELECTRIC CONSUMPTION	25W/25W
POWER CORD	–
OUTSIDE DIMENSIONS	196mm(W) x 174mm(D) x 112mm(H) Depth : Adjustable 174 – 204mm in 10mm steps
EXTERIOR	ABS Plastic
CONNECTIONS	Quick Fitting 8mm DIA (Cleaning water x 1, Sanitizing water x 1)
INSTALLATION CONDITIONS	Indoor
SAFETY DEVICE PROTECTION	–
WEIGHT	2kg(Gross 2.5kg)
ACCESSORIES	Quick Fitting Hose (8mmOD x 6mmID x 1m), Hose Clamp, Truss Head Machine Screw, Quick Fitting (8mm DIA), PVC Fitting(8mm DIA/13A), Valve Socket(13A)
OPERATING CONDITIONS	Ambient Temp: 5 – 35℃, Water Temp: 5 – 30℃, Water Supply Pressure: Max 0.2MPa(2.0bar)
PACKAGE	Carton 300mm(W) x 220mm(D) x 130mm(H)



2. CONSTRUCTION

[a] VALVE UNIT



[1] Dispense Sensor
Functions in the same way as the dispense/stop button. Senses a hand or object to start and stop dispensing electrolyzed water without using the dispense/stop button. The detection range is 50 mm.

[2] Electrolyzed Water Outlet
Dispenses sanitizing water or cleaning water.

[3] Outlet Lamp
Provided inside the electrolyzed water outlet. Illuminates in red while sanitizing water is being dispensed and in blue while cleaning water is being dispensed.

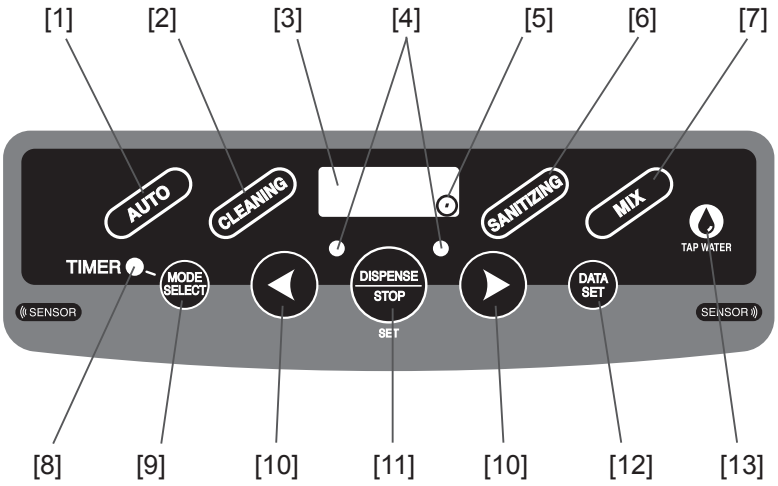
[4] AC Adapter
1 phase 90 - 264V

[5] Operation Panel
Provided with operation buttons, display, and lamps.

[6] Quick Fitting
Connected to the water delivery lines.

[7] Mounting Bracket
Fixes the product to the wall.

[b] OPERATION PANEL



[1] Auto Lamp (orange)

Comes on in the automatic dispensing mode.

[2] Cleaning Lamp (blue)

Flashes while cleaning water is being dispensed. Stays off in standby for the automatic dispensing mode and stays on in standby for the timer dispensing or continuous dispensing mode.

[3] Display

Indicates the dispensing time and data settings.

[4] Select Lamp (blue, red)

Indicates the type of electrolyzed water available by pressing the dispense/stop button in the timer dispensing or continuous dispensing mode.

Also indicates the type of electrolyzed water being dispensed.

Cleaning water = left, blue Sanitizing water = right, red

[5] Valve Reversal Mark

Comes on while the valve operation is reversed (with “U9” set to “1”). See “4. [a] STANDARD SETTINGS”.

[6] Sanitizing Lamp (red)

Flashes while sanitizing water is being dispensed. Stays off in standby for the automatic dispensing mode and stays on in standby for the timer dispensing or continuous dispensing mode.

[7] Mix Lamp (green) [option required]

Flashes while mixed water is being dispensed. Stays off in standby for the automatic dispensing mode and stays on in standby for the timer dispensing or continuous dispensing mode.

[8] Timer Lamp (orange)

Comes on or goes off when the mode select button is pressed.

Timer dispensing mode = ON Continuous dispensing mode = OFF

[9] Mode Select Button

Switches between the timer dispensing and continuous dispensing modes.

[10] Shift Button

Shifts to another dispensing mode. See “3. DISPENSING MODES AND OPERATION”.

[11] Dispense/Stop Button

Starts and stops dispensing electrolyzed water.

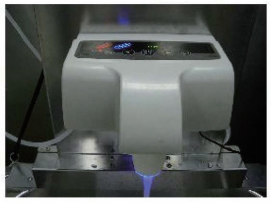
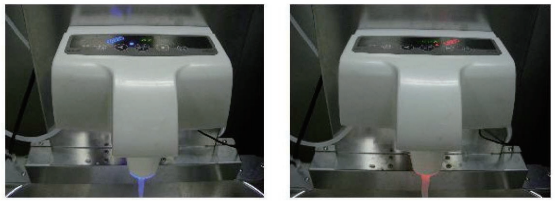
[12] Data Set Button

Press to check or adjust the dispensing mode settings.

[13] Tap Water Lamp (orange) [option required]

Flashes while tap water is being dispensed. Stays off in standby for the automatic dispensing mode and stays on in standby for the timer dispensing or continuous dispensing mode.

3. DISPENSING MODES AND OPERATION

<table>
<tr><td></td><td>Automatic dispensing mode</td><td colspan="2">Timer dispensing mode or continuous dispensing mode</td></tr>
<tr><td></td><td></td><td>Cleaning water</td><td>Sanitizing water</td></tr>
<tr><td rowspan="2">Display/ functions</td><td colspan="3">
Shift button
Shift button</td></tr>
<tr><td>Dispense sanitizing water and cleaning water automatically in the preset order for the preset time.</td><td colspan="2">Dispense sanitizing water and cleaning water for the preset time or continuously.</td></tr>
<tr><td>Set items</td><td>Dispensing order
Dispensing time</td><td colspan="2">Dispensing time (timer dispensing mode only)</td></tr>
<tr><td>Dispense/ stop button</td><td>Start/stop automatic dispensing</td><td>Start/stop dispensing cleaning water</td><td>Start/stop dispensing sanitizing water</td></tr>
<tr><td>Dispense sensor (left)</td><td>Start/stop automatic dispensing</td><td>Start/stop dispensing cleaning water</td><td>Start/stop dispensing cleaning water</td></tr>
<tr><td>Dispense sensor (right)</td><td>Start/stop automatic dispensing</td><td>Start/stop dispensing sanitizing water</td><td>Start/stop dispensing sanitizing water</td></tr>
<tr><td>Timer/ continuous</td><td>Timer dispensing only</td><td>Timer/continuous dispensing</td><td>Timer/continuous dispensing</td></tr>
<tr><td>Operation</td><td>1) Press the dispense/stop button, or hold up a hand over the dispense sensor.
The selected water is dispensed according to the timer setting. The cleaning/sanitizing lamp flashes, and the outlet lamp also illuminates. After the preset dispensing time has elapsed, the lamps go off and dispensing stops.
  </td><td colspan="2">1) Press the dispense/stop button, or hold up a hand over the dispense sensor.
The selected water is dispensed. The cleaning/sanitizing lamp flashes, and the outlet lamp also illuminates. In the portion dispensing mode, after the preset dispensing time has elapsed, the lamps go off and dispensing stops.
  </td></tr>
</table>

	Automatic dispensing mode	Timer dispensing mode or continuous dispensing mode	
		Cleaning water	Sanitizing water
Operation	2) To stop dispensing in the middle of the program, press the dispense/stop button, or hold up a hand over the dispense sensor.	2) To stop dispensing, press the dispense/stop button, or hold up a hand over the dispense sensor. The cleaning/ sanitizing lamp and outlet lamp go off, and dispensing stops.	
Flushing process	If sanitizing water is dispensed last, cleaning water is automatically dispensed for 1.5 seconds with the select lamps flashing.		

4. ADJUSTMENT

[a] STANDARD SETTINGS

To enter the adjustment mode, hold down the data set button for 3 seconds. "USEr" appears in the display.
To return to the normal mode, hold down the data set button for 3 seconds. "oooo" appears in the display.

* < > = optional setting

Code	Item	Description	Default
U1	1st water & dispensing time in automatic dispensing mode	0: None, 1: Cleaning, 2: Sanitizing, <3: Mixed>, <4: Tap> 1 to 200 sec (in 1 sec steps)	1: Cleaning 15 sec
U2	2nd water & dispensing time in automatic dispensing mode	0: None, 1: Cleaning, 2: Sanitizing, <3: Mixed>, <4: Tap> 1 to 200 sec (in 1 sec steps)	2: Sanitizing 15 sec
U3	3rd water & dispensing time in automatic dispensing mode	0: None, 1: Cleaning, 2: Sanitizing, <3: Mixed>, <4: Tap> 1 to 200 sec (in 1 sec steps)	0: None 15 sec
U4	4th water & dispensing time in automatic dispensing mode	0: None, 1: Cleaning, 2: Sanitizing, <3: Mixed>, <4: Tap> 1 to 200 sec (in 1 sec steps)	0: None 15 sec
U5	5th water & dispensing time in automatic dispensing mode	0: None, 1: Cleaning, 2: Sanitizing, <3: Mixed>, <4: Tap> 1 to 200 sec (in 1 sec steps)	0: None 15 sec
U6	Cleaning water dispensing time in timer dispensing mode	1 to 200 sec (in 1 sec steps)	15 sec
U7	Sanitizing water dispensing time in timer dispensing mode	1 to 200 sec (in 1 sec steps)	15 sec
U8	Neutralizing (cleaning) water dispensing time	0 to 10 sec (in 0.5 sec steps)	1.5 sec

Code	Item	Description	Default
U9	Valve reversal (*1)	0: L-cleaning, R-sanitizing 1: L-sanitizing, R-cleaning	0: L-cleaning, R-sanitizing
U10	Undetectable time after switching sensor ON/OFF (*2)	0 to 10 sec (in 0.5 sec steps)	1.5 sec
U11	Left/right sensor distinction (*3)	0: Yes 1: No	0: Yes
U12	Countdown in automatic dispensing mode (*4)	0: Individual 1: Total	0: Individual
U13	Cleaning water outlet lamp color & brightness (*5)	0 to 100% (in 1% steps)	Blue: 90% Red: 0% Green: 0%
U14	Sanitizing water outlet lamp color & brightness (*6)	0 to 100% (in 1% steps)	Blue: 0% Red: 90% Green: 0%
U50	Initialization (*7)	0: None 1: Initialize	0: None

*1 Open/close the solenoid valve opposite to the detecting sensor.
*2 Set the sensor response speed.
*3 Make the left and right sensors indistinctive.
*4 Select the automatic dispensing mode countdown between individual dispensing time for each type of water or total dispensing time.
*5 Adjust the color and brightness of the outlet lamp for cleaning water.
*6 Adjust the color and brightness of the outlet lamp for sanitizing water.
*7 Reset all the settings to the default settings.

[b] OPTIONAL SETTINGS (OPTION REQUIRED)

To adjust the settings “U15” and “U16”, select “Yes” in the service setting “d2”.
To adjust the settings “U17”, “U18”, and “U19”, select “Yes” in the service setting “d3”.

Code	Item	Description	Default
U15	Mixed water dispensing time in portion dispensing mode	1 to 200 sec (in 1 sec steps)	15 sec
U16	Mixed water outlet lamp color & brightness (*8)	0 to 100% (in 1% steps)	Blue: 0% Red: 0% Green: 90%
U17	Tap water dispensing time in portion dispensing mode	1 to 200 sec (in 1 sec steps)	15 sec
U18	Tap water outlet lamp color & brightness (*9)	0 to 100% (in 1% steps)	Blue: 40% Red: 40% Green: 0%
U19	Tap water addition (*10)	0: No 1: Yes	0: No

*8 Adjust the color and brightness of the outlet lamp for mixed water.

*9 Adjust the color and brightness of the outlet lamp for tap water.
*10 Add tap water to sanitizing water, cleaning water, and mixed water.

[c] SERVICE SETTINGS

To enter the adjustment mode, hold down the data set button and mode select button for 4 seconds. "dSEr" appears in the display.
To exit the adjustment mode and return to the normal mode, hold down the data set button and mode select button for 4 seconds. "oooo" appears in the display.

Code	Item	Description	Default
d1	Software version	Version number of software used	N/A
d2	Mixed water mode	0: No 1: Yes	0: No
d3	Tap water mode	0: No 1: Yes	0: No
d4	Neutralizing water type	1: Cleaning 2: Mixed 3: Tap	1: Cleaning
d5	Sensor function	0: ON 1: OFF	0: ON
d6	LED lamp flashing speed	0: Low 1: High	0: Low
d7	LED lamp flashing time	0.1 to 10 sec (in 0.1 sec steps)	1 sec
d8	Portion dispensing mode (action with sensor reactivated)	0: Stop 1: Extend	0: Stop
d9	Continuous dispensing mode protection time	0 to 1,000 sec (in 10 sec steps)	300 sec
d10	Automatic dispensing mode activation counter	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d11	Cleaning water mode activation counter	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d12	Sanitizing water mode activation counter	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d13	Mixed water mode activation counter	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d14	Tap water mode activation counter	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d15	Cleaning water sensor activation counter (*2)	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d16	Sanitizing water sensor activation counter (*2)	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d17	Dispense/stop button activation counter (*2)	0 to 99,990,000 times (in 1 time steps) (*1)	0 time
d18	Cleaning water valve activation counter	0 to 5,000,000 times (in 1 time steps) (*1)	0 time

Code	Item	Description	Default
d19	Sanitizing water valve activation counter	0 to 5,000,000 times (in 1 time steps) (*1)	0 time
d20	Tap water valve activation counter	0 to 5,000,000 times (in 1 time steps) (*1)	0 time
d21	Control board activation counter	0 sec to 10 years (in 0.1 sec steps)	0 sec
d22	Demo mode	0: Normal 1: Demo	0: Normal
d23	Demo mode interval	0 to 200 sec (in 1 sec steps)	60 sec
d24	1st dispensing in demo mode	<1st digit: water type> 1: Cleaning 2: Sanitizing 3: Mixed 4: Tap <2nd to 4th digits: time> 0 to 200 sec (in 1 sec steps)	1: Cleaning 10 sec
d25	2nd dispensing in demo mode	<1st digit: water type> 1: Cleaning 2: Sanitizing 3: Mixed 4: Tap <2nd to 4th digits: time> 0 to 200 sec (in 1 sec steps)	2: Sanitizing 10 sec
d26	3rd dispensing in demo mode	<1st digit: water type> 1: Cleaning 2: Sanitizing 3: Mixed 4: Tap <2nd to 4th digits: time> 0 to 200 sec (in 1 sec steps)	0 10 sec
d27	4th dispensing in demo mode	<1st digit: water type> 1: Cleaning 2: Sanitizing 3: Mixed 4: Tap <2nd to 4th digits: time> 0 to 200 sec (in 1 sec steps)	0 10 sec
d28	5th dispensing in demo mode	<1st digit: water type> 1: Cleaning 2: Sanitizing 3: Mixed 4: Tap <2nd to 4th digits: time> 0 to 200 sec (in 1 sec steps)	0 10 sec
d29	Initialization	0: No 1: Yes (*3)	0: No

*1 To reset the settings “d10” to “d20” to 0, hold down the two shift buttons for 3 seconds.

*2 The number of sensor/button activations from the off state.

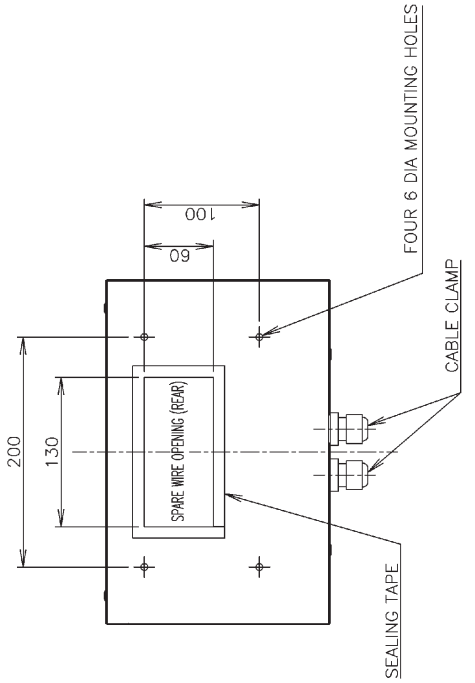
*3 Selecting “1” and exiting the adjustment mode will reset all the settings except the activation counters to the factory defaults.

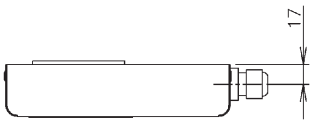
V. REMOTE CONTROLLER ROX-RCUA (OPTION)

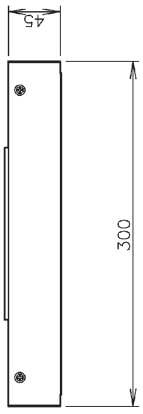
1. DIMENSIONS/SPECIFICATIONS

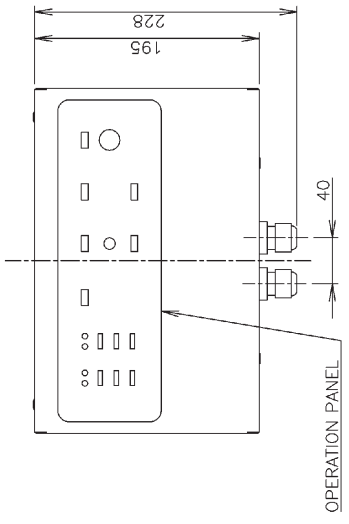
ITEM	Hoshizaki Remote Controller for Water Electrolyzer
MODEL	ROX-RCUA-E (EW)
POWER SUPPLY	From ROX-30/60SA-E [5V, 12V DC]
OUTSIDE DIMENSIONS	300mm(W) x 45mm(D) x 195mm(H)(excluding cable clamps)
EXTERIOR	Stainless Steel
INSTALLATION CONDITIONS	Indoor
WEIGHT	1.8kg(Gross 2.3kg)
PACKAGE	Carton 370mm(W) x 220mm(D) x 100mm(H)
ACCESSORIES	Terminal Block for ROX-30/60SA-E, Screws, Grommets, Cable Clamps
ON-SITE SUPPLIES	Power Cable (unit - remote controller) VCTF 4-core 2.0mm² vinyl cabtire round cable (max length 150m) or VCTF 4-core 1.25mm² vinyl cabtire round cable (max length 100m) Communication Cable (unit - remote controller) 6-core (3 twisted pairs) 0.5mm² shielded cable *4 cores used, 2 cores spared
OPERATING CONDITIONS	Ambient Temp: 5 - 35℃, Water Temp: 5 - 30℃,

1. This is a remote controller for ROX-30/60SA-E. Power is supplied from the unit.
2. Installation with a distance of more than 150m between the unit and the remote controller is subject to consultation.









REMOTE CONTROLLER INSTALLATION INSTRUCTIONS

See ROX-30/60SA-E instruction manual for use and operation.

■Required Parts

Accessories

- Tapping screw (4x16) 4 pcs [for mounting base]
- Terminal block 1 pc [for ROX unit]
- Grommet 2 pcs [for sealing wiring hole]
- Pan head machine screw (4x16) 2 pcs [for securing terminal block]
- Cable clamp 2 pcs [for remote controller]
- Cable clamp 2 pcs [for ROX unit]

On-site Supplies

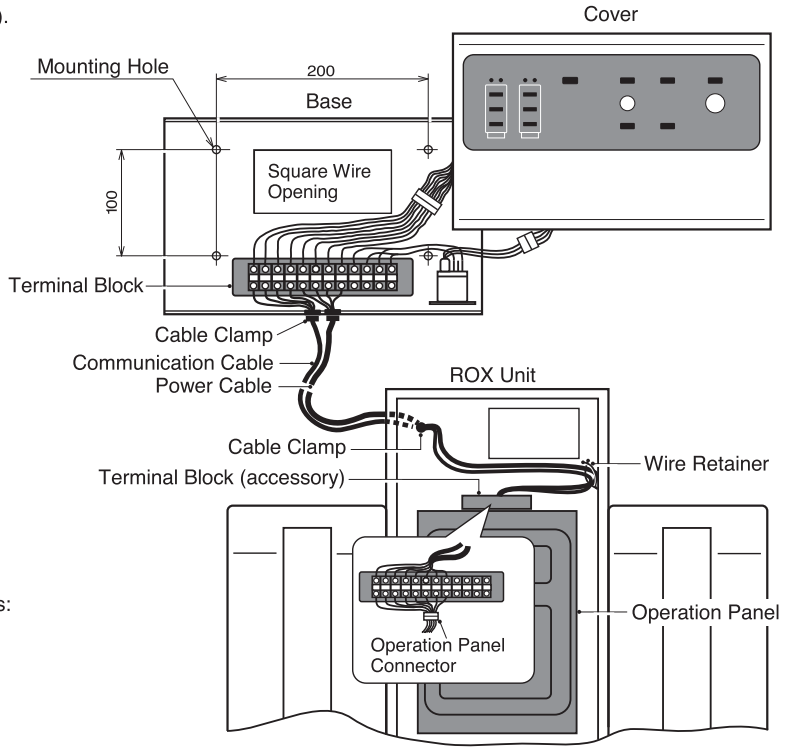
- Communication cable (6-core 0.5mm^2) ⋆2 cores spared
- Power cable (VCTF 4-core 2mm^2, max length 150m) or (VCTF 4-core 1.25mm^2, max length 100m)

■Wiring

CAUTION: Check wiring before turning on power supply. Misconnection may damage control board.

1. Remove the screws and cover from the remote controller. Disconnect the connectors (two types).
2. Secure the remote controller base to the wall with the four screws provided.
3. Connect the communication and power cables according to the wiring diagram attached on the cover. Be sure to insulate the shielded wires of communication cable on the remote controller.
4. To route the cables from the bottom of the remote controller, attach the two cable clamps provided to the base and secure the cables. (To route the cables from the back of the base, attach the two grommets provided to the base.)
5. Reconnect the connectors disconnected in step 1, replace the cover, and secure with the screws. Be careful not to pinch the wires.
6. Mount the terminal block provided to the top of the operation panel on the ROX unit.
7. Connect the free end of the cables from the remote controller to the terminal block mounted on the ROX unit. Connect the shielded wires of communication cable on the ROX unit to the "GND" on the terminal block. Replace the grommets on the rear panel of the ROX unit with the cable clamps provided. Route the wires through the cable clamps, secure with the wire retainer on the right side of the rear panel, and connect to the terminal block. Provide an allowance of about 200mm to the cable length to make the operation panel easily removable for service.
8. Disconnect the unnecessary short-circuit connector from the operation panel connector on the ROX unit, and connect the connector of the terminal block mounted in step 6.

Remote Controller



■External Device Connections

To install an indicator lamp or buzzer in addition to the remote controller, prepare the following parts:

- Indicator lamp/buzzer [rated load 100 - 250VAC (max 7.5A)] for add salt/error
- Power cord
- Output cable

Connect the above parts to the relay contacts inside the remote controller.
[Add salt output (relay contact): terminal block 5, 6 / error output (relay contact): terminal block 7, 8]